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FEBRUARY 1945

# THE BULLETIN

OF THE

**U. S. Army Medical Department**

**A periodical containing original articles, reviews, news, and  
abstracts of interest to the Medical Department of the Army**

**ISSUED UNDER THE AUSPICES OF  
THE OFFICE OF THE SURGEON GENERAL**

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**PUBLISHED MONTHLY AT THE MEDICAL FIELD SERVICE SCHOOL,  
CARLISLE BARRACKS, PENNSYLVANIA**

**By direction of the Secretary of War, the material contained herein is published as administrative information for the proper transaction of the public business and with the approval of the Director of the Budget.**

**NORMAN T. KIRK,  
Major General, U. S. Army,  
The Surgeon General.**

**NUMBER 85**

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**ISSUED MONTHLY**

**WAR DEPARTMENT**  
**OFFICE OF THE SURGEON GENERAL,**  
**WASHINGTON 25, D. C.**

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## **OF THE**

### **U. S. Army Medical Department**

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## Foreword

With the October 1943 issue, The Bulletin became a monthly periodical, instead of a quarterly, dedicated to keeping the personnel of the Medical Department informed on developments in war medicine. The new publication, known as The Bulletin of the U. S. Army Medical Department, absorbed the former quarterly dental and veterinary bulletins and will have material devoted to those fields in each issue.

The Bulletin is intended to be educational rather than directive in nature. It will contain the best information obtainable concerning military medical experience, observations, and procedure that may help to improve further the quality of professional services. The Bulletin will be a medium whereby experience gained in one theater of combat may be shared with those serving in other combat areas and with those in this country who are preparing for overseas duty. News items concerning military and scientific developments as well as original articles will be emphasized. The Bulletin, however, should not serve as a basis for the forwarding of requisitions for equipment or supplies referred to therein.

Obviously, some of the most interesting field experiences cannot be divulged in a periodical of this kind when our country is at war. The Bulletin will, however, publish that which can be safely told, drawing not only on current literature, but on many authoritative reports which reach The Surgeon General's Office from the field. Officers are invited to submit for publication reports of their field experiences that can profitably be shared with other officers.

The Medical Department has been commended for its work in caring for the sick and wounded in theaters of operations in war. The Bulletin will endeavor to stimulate such progress and to advance further the high standard of medical service in the Army of the United States.

# Contents

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## A LETTER TO HOSPITAL COMMANDERS

### NEWS AND COMMENT

	<i>Page</i>
Trench Foot .....	1
The Pathology of Trench Foot .....	3
Blood Transfusion in the Reparative Management of Battle Wounds..	4
Appeal for Donations of Whole Blood .....	5
Malaria in the Army .....	6
Pentothal Anesthesia .....	7
New General Hospital Weekly .....	9
The Care and Maintenance of Army Vehicles .....	9
Simplification of Hospital Administration .....	10
Tuberculosis in the Army .....	11
Leprologists .....	11
Thoracoabdominal Wounds .....	12
Training Film—"Introduction to Combat Fatigue" .....	12
New Linen Control and Distribution System .....	13
Examination for Regular Corps U. S. Public Health Service .....	13
Penicillin in the Treatment of Vincent's Stomatitis .....	15
Filariasis .....	16
Field Test of Rations .....	17
Foreign Quarantine in International Army Traffic .....	18
Frozen Milk for Hospital Ships .....	19
Transmission of Primary Atypical Pneumonia to Human Volunteers..	20
Simple Method of Administering Fluids Orally .....	21
Surgery of the Hand .....	21
Multiple Blood-Typing Technique .....	22
Notes from Hospitals in Normandy and England .....	23
The Cerebral Form of Malaria (Correction) .....	24
Prevention of Toe Contractures .....	25
Army Water Supplies in the United States .....	26
Reconditioning Notes .....	26
Hot Cooked Hospital Food .....	27
WAC Hospital Technicians Urgently Needed .....	28
Fluid Intake After Hemolytic Transfusion Reaction .....	29
Disinfection of Vegetables and Fruits .....	30
Progress in the Medical History Program .....	31
Reduction in the Medical Corps of the Army .....	31
A Portable Lightweight Fracture Frame .....	32
Intravenous Drip Tube .....	33
Abuse of Medical Disposition Channels .....	34
Army Medical Museum Seminars .....	35
Water Purification in China .....	37
Dissemination of DDT by Aircraft .....	38
The Medical Supply Catalog .....	39
Medical Department Officers in Civil Affairs .....	42
The Clinical Psychological Program .....	44
War Wound Moulages .....	46

The Sanitary Corps .....	47
Physical Fitness Dental Health Program .....	47
Committee for Insect and Rodent Control .....	48
Rodents in the Philippines .....	48
Jungle Fruits and Vegetables .....	49
Conference of Service Command Surgeons .....	54
New Pamphlets for Soldiers .....	54
The Philippine Islands .....	55
Medical Department Units Cited .....	56
The Walter Reed Medal .....	56
Award of Legion of Merit .....	57
Award of Bronze Star Medal .....	58
Recent Directives and Publications .....	59 and 118
"This Is the Army" .....	63
Dental Caries and Fluorine .....	83

## SPECIAL ARTICLES

PLAN FOR SETTING UP A 750-BED EVACUATION HOSPITAL	
Colonel W. F. MacFee, M.C., A. U. S. ....	61
RAT CONTROL AT FORT DEVENS	
Captain George J. Coogan, Sn.C., A. U. S. ....	64
RELAPSING VIVAX MALARIA .....	71
EVACUATION OF PATIENTS AT A UNITED STATES PORT	
Major Sidney Robbin, M.C., A. U. S., and Captain Thomas G. Scott, T.C., A. U. S. ....	75
EXPERIENCES WITH THE GASTROSCOPE	
John Tilden Howard, M.D. ....	84
HEMOLYTIC STREPTOCOCCUS PNEUMONIA .....	88

## ORIGINAL ARTICLES

EARLY MANAGEMENT OF WOUNDS OF THE HAND	
Lieut. Colonel Condict W. Cutler, Jr., M.C., A. U. S. ....	92
A GASTRO-INTESTINAL OUTPATIENT SERVICE	
Captain Max Magnes, M.C., A. U. S. ....	99
ADJUSTING THE EMOTIONALLY UNSTABLE SOLDIER	
Major S. A. Sandler, M.C., A. U. S., and Captain S. R. Rotman, Q.M.C., A. U. S. ....	103
VERIFICATION TESTS IN SERODIAGNOSIS OF SYPHILIS	
Major Charles R. Rein, M.C., A. U. S., and Colonel George R. Callender, M. C., U. S. A. ....	108
DENTAL STUDY OF U. S. SOLDIERS IN THE TROPICS	
Captain Harold B. Zeitlin, D.C., A. U. S. ....	113

## APPARATUS

SPOT FILM DEVICE FOR ARMY RADIOGRAPHY	
Captain Stanley M. Wyman, M.C., A. U. S. ....	119

## **A LETTER TO HOSPITAL COMMANDERS**

**As commanding officer of an Army hospital you are more than a doctor. Thousands of soldiers come to your hospitals for medical treatment and care, and it is your job to see that they get the very best. But if you treat only their bodies and forget their minds and spirits, you will have accomplished less than your full duty.**

**Many of these young men who will come to your hospital sick, injured, or wounded have had little opportunity to participate as civilians in adult life. Some have actually achieved adulthood in the Army. Of those patients of yours returning to duty, some will go back as combat-experienced soldiers. They know what lies immediately ahead for them, and there will be many unanswered questions on their minds. Skillful, understanding, and realistic guidance will be necessary, not guidance based on talk but more on that unspoken understanding which exists between those who have shared common experiences. A proper word at the right time will do them more good than an elaborate system of guidance.**

**Some patients who have missed the struggle of growth from adolescence into adult status, which they normally would have experienced in civilian life, will be disqualified for further military service because of illness, injuries, or wounds. On their return, they will enter an adult civilian world to which they will be strangers. The boy who went to war will return a man, a traveler who has seen the world, one who has made new friends and now has a new, broader, and, in some ways, unique outlook on life. Home and the home-town folks may not measure up to his new stature. Changes in both will have to be reconciled. The home town will seem small, and the old road to the schoolhouse amazingly short and narrow.**

**While recuperating from wounds and illness, these men will have much time to think. Here is your opportunity to help them to organize their thinking, to orient themselves with respect to things for which they fought and for which they may fight again, to contemplate their country and its problems and their part as experienced soldiers or as mature citizens in adult civilian life.**

As a leader of men, you will seize this opportunity. No one is in a more strategic position than the nurse, the doctor, and the corpsman to know and appreciate the specific needs of patients. It is important to encourage them to consider the life to which they are returning, to take stock of themselves, and to develop self-reliance. In some cases, young men whose life plans have been interrupted by war may be encouraged to gather up the threads again and go on to weave their own pattern of living. Material for weaving life patterns is available in every hospital if imagination, enterprise, and leadership are present.

But you say you have insufficient personnel. Your staff is as highly educated as that of most colleges. If that staff will see clearly the needs and possibilities and will concentrate effort on cases likely to profit from reconditioning, there is no limit to what can be done. I do not mean that your doctors and nurses will become teachers. Educational reconditioning officers and assistants are provided for that primary purpose, but they need the cooperation of your doctors and nurses who should understand all that is offered to the patient. Treatment of the whole patient, watching closely his progress, encouraging him to participate, taking pride in his mental as well as physical progress, is an essential of good medical care.

Reconditioning is not a specialized function to be performed between certain hours. It is the duty of all the staff all the time, and all must work together to accomplish it. No greater challenge has been offered at any time to any group of men and women, no greater opportunity to serve patients well and lastingly. If you as commanding officer meet this challenge, if you can inspire every doctor and every nurse to consider the minds and spirits of their patients, you will make of them not only menders of bodies, but builders of men.



Major General, U. S. Army,  
The Surgeon General.





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TRENCH FOOT

Trench foot has again loomed into importance as a factor contributing to noneffectiveness, this time on the very fighting front where in the last war the British suffered so heavily from this condition. Despite the experience of the last war and the experience in Italy last winter, adequate control of trench foot is yet to be attained. The basic principles of a satisfactory control program are:

1. *Provisions of suitable equipment.* Loose-fitting waterproof or water-resistant boots with thick, replaceable, felt inner-soles and woolen socks may be best under certain conditions. However, even with existing footgear, adequate protection against trench foot can be achieved by careful observance of the measures listed below.

2. *Avoidance of unnecessary risk.* a. Standing in water or mud-soaked areas should be avoided as much as possible.

b. Cramped positions, prolonged immobility, and dependency of the extremities should be avoided. These can be counteracted by stationary exercise of the feet and legs.

c. In cold, wet weather, troops should be rotated and relieved from front-line duty as often as the tactical situation permits.

3. *Enforcement of adequate individual hygiene.* a. Wet socks or innersoles should be changed to dry ones as often as possible. Troops should carry a dry, extra pair at all times.

b. Shoes should be removed at least once daily, and the feet cleaned and dried.

c. The upper part of the body should be kept as warm and dry as possible.

d. Noncommissioned officers must be prepared to supervise their men in the care of their feet. Frequent inspections by unit commanders will be valuable in enforcing proper foot hygiene and also in detecting early clinical manifestations of the injury when men are exposed to trench foot.

Apart from the provision of equipment, control rests with the individual himself. The measures to be taken are elementary but relatively unfamiliar to soldiers without either appropriate pre-combat training or combat experience on cold, wet terrain, and they require diligent application to be effective. An otherwise well conceived and executed control program can be defeated as it sifts down the chain of command unless *all* echelons enforce

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From the Surgical Consultants Division, Surgeon General's Office.

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After this issue of the Bulletin was made up and parts of it had been printed, requests were received to publish the following items: "Examination for Regular Corps U. S. Public Health Service," page 13; "Fluid Intake after Hemolytic Transfusion Reaction," page 29; and "Hemolytic Streptococcus Pneumonia," page 88. This necessitated removing certain other items the titles of which had already been printed in the Index. This issue contains, therefore, three items which are not indexed, while certain items indexed do not appear in the pages.

individual hygienic measures and foster policies of relief and rotation calculated to minimize exposure. Daily foot inspections by commissioned or noncommissioned officers and enforced exercise and change of footgear exemplify the type of rigorous surveillance which is difficult to ensure yet must be attained if control is to be achieved.

For its development, trench foot does not require freezing temperatures. Continued exposure in cold, wet trenches or fox-holes, with restricted movement, and the wearing of wet socks and footgear without change, often for days on end, are the typical predisposing conditions. Its great military significance is that almost invariably it incapacitates front-line fighting troops, the greatest proportion of whom can never return to combat duty.

Medical opinion will not agree that trench foot is inevitable in the face of unfavorable environmental conditions such as those existing on the western front, but nevertheless the current experience is a measure of the toughness of the problem. Shortages of equipment play an important but secondary role. Only particularly vigorous command action to enforce individual foot hygiene will hold admissions to a reasonable level and prevent a heavy and unnecessary drain on front-line fighting strength.

#### Treatment

The principles of treatment consist essentially of rest, avoidance of local trauma and infection, elevation of the feet to promote drainage of edema fluid and reduction of metabolism in the affected parts. The patient should be kept in bed with the lower legs and feet elevated on pillows slightly above heart level and protected from external pressure either by complete exposure or by means of a cradle. The period of bed rest is determined by the degree and rate of subsidence of edema and circulatory disturbances. Whereas the individual should be kept comfortably warm, maintenance of minimal tissue metabolism in the affected parts is important and the application of external heat to the feet must be avoided. In certain cases in which pain is prominent and persistent, actual cooling of the limbs may be indicated. Massage or rubbing of any sort in the early stages and all antiseptics and ointments should be avoided. The part should be handled as little and as gently as possible. Measures to prevent secondary infection, including tetanus, should always be instituted, and in cases with threatening infection, sulfadiazine by mouth should be used. Areas of necrosis and ulceration which may subsequently develop should be treated conservatively until surgical intervention becomes necessary.

Additional information concerning trench foot will be found in War Department Circular No. 312, dated 22 July 1944; War Department Technical Bulletin TB MED 81, dated 4 August 1944; and in the *Bulletin of the U. S. Army Medical Department* of November 1943, page 26; March 1944, page 46; June 1944, page 91; and December 1944, page 58.

### THE PATHOLOGY OF TRENCH FOOT

The pathologic changes in trench foot have been studied at the Army Institute of Pathology. The studies were based on surgical specimens and autopsy material. The injuries were incurred in Italy and the Aleutians and resulted from exposure to wet cold, in most instances the temperature having been above freezing. Secondary infection was common, and anaerobic gas-forming bacteria were cultured in several cases.

In three cases death had occurred seven to ten days after exposure, during the hyperemic and edematous phase. The lesions in these three early cases consisted of striking dilatation and engorgement of the vessels of the skin and subcutaneous tissues. Agglutinative thrombi, composed chiefly of red cells and platelets with little fibrin, were widespread in the congested vascular tree. Hemolysis was also noted. The acute inflammatory reactions which were observed throughout the tissues presented no unusual features. Disintegration of axis cylinders and degeneration of myelin in peripheral nerves were already evident. The small and unmyelinated groups of sympathetic fibers in the nerve trunks appeared unaltered, but the large medullated fibers showed conspicuous involvement.

In eleven late cases amputation was performed because of gangrene one to five months after injury. Sections of a leg removed thirty days after exposure showed organization of thrombosed vessels. In the other late cases the vascular changes were those of endangiitis obliterans resembling Buerger's disease. The degeneration, ischemic necrosis, and infarction present in both soft tissues and bone were succeeded by scarring and atrophy. The phagocytosis of lipoid and atrophy of fat in the subcutaneous adipose tissue were especially pronounced. In the muscle the lesions consisted of simple atrophy and ischemic changes comparable to those of Volkmann's contracture. Necrosis of bone without sequestration was followed by sheathing of the dead trabeculae with new osseous lamellae; the resultant picture is comparable to that of Sudeck's atrophy.

The anatomic changes observed in the present study and those described in previous reports have been evaluated in the light of modern concepts of the functional and morphologic effects of cold on tissues. It has been concluded that the conventional distinction between "true frostbite" and the injury produced by chilling when the freezing point is not reached should be abandoned since the tissue reactions follow the same general pattern. Most of the damage is a consequence of the disturbance in the circulation and the resultant vascular obstruction. The delayed sensitivity to cold which follows apparent recovery may be caused in part by the damage to the subcutaneous panniculus and is certainly related to the occlusive peripheral vascular disease.

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Abstract of paper by Captain Nathan B. Friedman, M.C., A.U.S., submitted to the American Journal of Pathology.

### BLOOD TRANSFUSION IN THE REPARATIVE MANAGEMENT OF BATTLE WOUNDS

The value of whole blood transfusion in the preparation of patients for reparative surgery is being recognized more and more as the war progresses. A report from the Surgical Consultant in NATOUSA emphasizes the importance of whole blood as an adjunct in wound management. It is stated that many of the operations on complicated wounds are major undertakings often concerned with compound fractures. The wounds and fractures are frequently multiple and the operations are attended by blood loss in considerable quantity.

Experience in the interior had demonstrated the wisdom of supporting a patient suffering from chronic sepsis with liberal blood transfusion before undertaking secondary operative procedures. In this overseas theater a significant number of the wounded show a profound reduction in hemoglobin and hematocrit values on arrival at a base hospital following initial wound surgery in the forward area. This occurs despite the liberal use of transfusions in the Army area. Doubtless these anemias would correct themselves spontaneously with an adequate diet supplemented by iron therapy if delay were possible. There is, however, an urgent need to get ahead with the surgical program to prevent or cut short infection. The time-lag between initial surgery and reparative surgery has been considered a second "golden period" in wound management, perhaps equal in significance with the period between injury and initial surgery. Early closure of a gaping wound is imperative if for no other reason than to prevent bacterial seeding of the raw surface during hospital dressings. It is also important to repair large defects by suture before fibroplasia stiffens the tissues and makes approximation impossible without leaving dead spaces.

To enable these patients with low hemoglobin and hematocrit values to withstand the necessary surgical procedures, and to profit by any favorable effect that the correction of anemia may have on the process of healing, an extensive use of blood transfusion has developed in the base.

The copper sulfate method of estimating the hematocrit, hemoglobin, and plasma protein concentrations has been used as the standard laboratory procedure. As a simple clinical index it may be estimated that 500 cc. of whole blood are necessary for each 3 points of desired hematocrit increase. The volume of whole blood administered in a 24-hour period should not exceed 1,000 cc. when the hematocrit is less than 40 percent, or 500 cc. when the hematocrit is 40 percent or above. As an ideal goal, a preoperative value of 45 percent

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From the Surgical Consultants Division, Office of The Surgeon General.



with a plasma protein concentration of 7.5 grams percent or less is desirable. Subsequent to operation, no attempt has been made to establish levels above a hematocrit of 40 percent with a plasma protein concentration of 6.5 grams percent.

#### APPEAL FOR DONATIONS OF WHOLE BLOOD

Major General Paul R. Hawley, Chief Surgeon, European Theater of Operations, stated in December on the *Army Hour* over NBC that battle experience has shown we must have one pint of blood for every two casualties. The preinvasion estimate of one pint for every five wounded men was too low.

"We need to call on you people at home for more donations of whole blood. I cannot emphasize too strongly," General Hawley said, "the importance of increased contributions of blood for the sole purpose of saving the lives of wounded soldiers. Many people have responded generously to our past appeals for blood—but we are not yet receiving daily minimum requirements." Five special centers have been set up on the



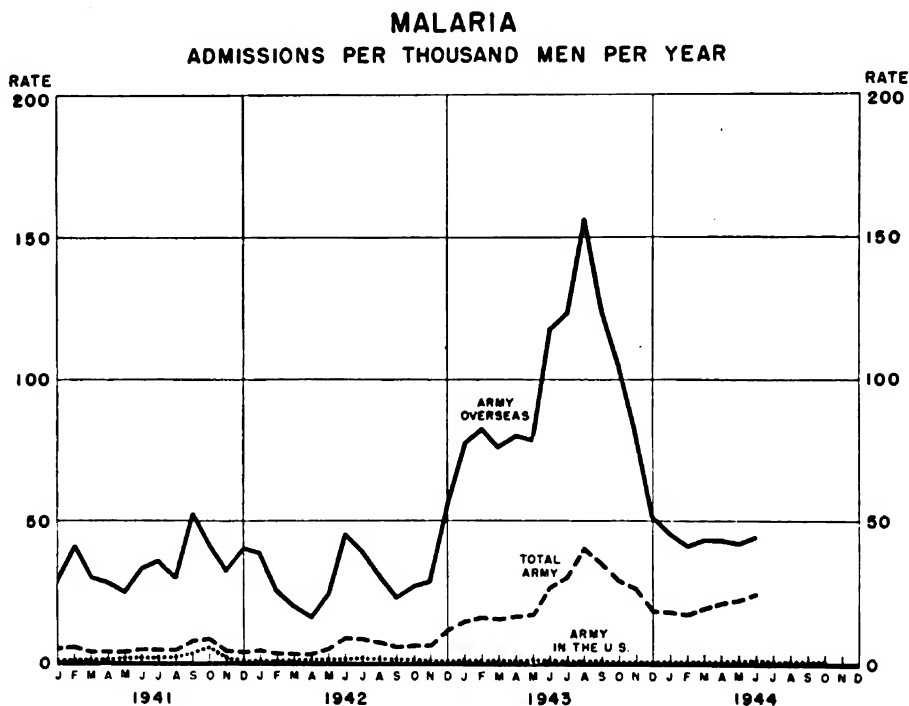
Major General Paul R. Hawley, Chief Surgeon, European Theater of Operations. Signal Corps photograph.

East Coast and three on the West Coast where "O" type blood is collected by the Red Cross and flown daily by the Army to theaters of operations. Whole "O" type blood reaches the E.T.O. within twenty-four hours after being collected at Baltimore, Boston, New York, and Washington, D.C. Blood collected in California at San Francisco, Oakland, and Los Angeles is flown to Pacific installations within three days.

General Hawley, who was sent to the British Isles, 16 September 1941, as a special Army observer, is among the oldest in point of service in that theater. He was made chief surgeon on 27 July 1942 and achieved his present rank on 27 February 1944. He has been awarded the Legion of Merit, and more recently, an honorary LL.B. degree by the University of Cincinnati, where he received an M.D. in 1914, and at Johns Hopkins University a D.P.H. in 1923.

### MALARIA IN THE ARMY

The chart is a graphic summary of the Army's experience with malaria from the beginning of 1941 through June 1944. In 1941 and the early part of 1942, when the overseas activity consisted largely of expanding old bases and establishing new ones, standard antimosquito methods were used to prevent transmission of malaria. The proper location of camps, drainage in camp areas, screening of buildings, oil and Paris green larviciding, and killing adult mosquitoes with pyrethrum spray served to keep the admission rates at reasonable levels. In the United States a concentrated effort was made to render all installations free of *Anopheles* mosquitoes, and in selected areas the work was supplemented by mosquito control in perimeter zones by the U. S. Public Health Service.



In the early days of the war, because of the urgency of the military situation, units sometimes went into combat unprepared to deal with malaria, and numerous infections resulted. That experience is shown in the increase of malaria rates which began in the latter part of 1942. In the meantime, malariologists and malaria-survey and malaria-control units were trained and sent into the field to assist in the control program. These units accomplished remarkable feats in eliminating mosquito hazards at base staging areas, and in many places carried on their work in forward combat zones; however, it was soon demonstrated that for soldiers in combat, chief reli-

From the Tropical Disease Control Division, Preventive Medicine Service, Surgeon General's Office.

ance for control must be placed on individual protective measures, and special training of troops in malaria control was provided. Emphasis was placed on the use of protective clothing, bed nets, insect repellent, sprays, and the taking of suppressive drugs when ordered.

By 1944 malaria rates were greatly reduced and this reduction has been maintained in spite of greatly enlarged military operations in the tropical theaters. Lowered rates have been due to widespread use of atabrine suppressive treatment as well as to mosquito control and improved malaria discipline. During 1943 when malaria was most prevalent in the Army, the hospital admission rate for malaria among troops overseas was 95 per 1,000 per year. The rate for all diseases among oversea troops was 856 per 1,000 per year.

Attention is called to the increase in malaria rates for the total Army during 1944 without corresponding increase in either of the other curves. The curve for the Army in the United States includes only those infections presumably acquired in this country. Admissions for relapsing malaria in troops in the United States who acquired their infections overseas are included only in the curve for the total Army.

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#### PENTOTHAL ANESTHESIA

In the May 1944 *Bulletin* attention was directed to an overseas report on pentothal anesthesia, which brought to light a high death rate attributable to sodium pentothal and pointed to the unwise use of this agent rather than its inadequacy for military purposes. Another report from the same overseas theater has been submitted which compares present experience with that previously recorded and demonstrates the improvement that has been achieved through education in its more rational use. It is stated that a year ago the death rate from pentothal anesthesia was so high that the question was raised of abandoning the agent. However, examination of the deaths that occurred indicated that two correctible factors were present: (1) its use by completely inexperienced individuals, and (2) its use in cases in which it was actually contraindicated. Because of the advantage of the agent in warfare, the decision was made to continue its use, at the same time taking measures to correct these two factors.

The collected data show that whereas the over-all pentothal death rate a year ago was 1 to 450, the present rate is 1 to 5,500. That this great improvement in the anesthesia death rate from pentothal has not come about at the expense of abandoning pentothal is shown by the fact that although a year ago the agent was employed in 53 percent of the cases, at present it is employed in 62 percent of the cases in the forward

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From the Surgical Consultants Division, Office of The Surgeon General.

hospitals, and these respective figures for the rear hospitals are 28 and 48 percent. Thus, despite the fact that the use of pentothal has actually increased over the past year, a great reduction in the anesthesia death rate has occurred, clearly showing how well, through education and experience, its intelligent application has been effected. As previously emphasized, pentothal has proved especially valuable as an anesthetic in military surgery in procedures in which relaxation is not essential, and particularly for short (half-hour) operations and on individuals in good condition. The routine use of atropine as preanesthetic medication, the administration of oxygen, and frequent observations of pulse and blood pressure during the anesthesia are considered important factors in the safe use of pentothal. The use of pentothal should be avoided when the operative position or procedure may interfere with the airways or make respiration difficult, as in operations performed in the face-down position and operations on maxillofacial injuries, or infection about the neck, and other conditions involving the airways. Pentothal is also not considered a wise choice in intracranial surgery, in burns, and in conditions in which it is believed liver damage exists.

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Bamboo constructed operating room in the Assam jungle.



### NEW GENERAL HOSPITAL WEEKLY

The Information and Education Division, Army Service Forces, at its branch, 205 East 42d Street, New York City, has announced a new weekly magazine for distribution among patients in Army general hospitals in the United States. The idea, it is said, was conceived by General George C. Marshall, Chief of Staff. The principal objective of the magazine, which is called *Outfit*, is to form a definite and strong link between men who have become casualties and the unit with which they trained and fought. One officer and two enlisted men will serve as full-time correspondents in each major command and part-time battalion reporters will be appointed in units all over the world. Contributions and letters will be welcomed.

### THE CARE AND MAINTENANCE OF ARMY VEHICLES\*

Ambulances, jeeps, trucks, and other vehicles used in the Medical Department in these days of strain and battle are taking severe punishment. Preventive maintenance is the answer to how to keep automotive equipment serviceable. A truck driver from the South Pacific Area claims that his vehicle was used for nearly two years without an overhaul—all because of preventive maintenance. Despite jungle hazards in terrain and weather, continuous application of first- and second-echelon maintenance carried this vehicle through. The deadlining of vehicles in an infantry division in France was reduced to a minimum by a strong campaign for preventive maintenance followed by rigid inspection. Instruction in preventive maintenance in the First Army prior to the invasion of France paid big dividends later on the battlefield.

A sound, two-weeks refresher course in preventive maintenance for all officers and men who handle vehicles is the first step in stopping the deadlining of vehicles. Drivers should review the use of W.D. Form No. 48 and the various technical manuals pertaining to the vehicles which they operate. They should thoroughly review also the new driver's manual, TM 21-305, which is issued in pocket size. The assignment each day of a motor officer is important. Checks on vehicles should be made before operation, at halt, and after operation. A commanding officer should make spot checks at frequent intervals in accordance with W.D., A.G.O. Form No. 9-70, dated 17 June 1944. The motor officer follows up results of preventive maintenance. High ranking officers should make frequent inspections of rolling stock, as the responsibility for proper maintenance goes right to the top.

Excessive speeds wear down vehicles more than anything else—especially fast driving downhill in lower gears. The maximum permissible speeds are generally found on the dash of all vehicles. Racing downhill in lower gears is disastrous to engines, the momentum of the load taking a heavy toll of pis-

\*From the Maintenance Division, Headquarters, Army Service Forces.



ton and cylinder walls, connecting rod bearings, and even the shaft. Disengaging the clutch of a truck moving downhill in lower gear, then quickly letting back the clutch pedal, while coasting, frequently destroys engines.

Preventive maintenance starts with the tires and continues right on into the engine. Tire pressures should be kept up at all times and drivers should be trained to avoid striking curbs, rocks, and holes in the road. Bearings must be cleaned thoroughly and properly lubricated. Tires and antifriction bearings are most critical items at present.

#### SIMPLIFICATION OF HOSPITAL ADMINISTRATION

The Surgeon General has been directing a study of Army hospitals in the zone of the interior aimed at reducing to a minimum their administrative burden. This is being accomplished by changes in Army Regulations and by the development of standardized and simplified procedures. As a result, professionally trained personnel will be able to devote more time to the care of the sick and wounded, and less to paper work.

One example of a change in regulations is the recent directive<sup>1</sup> eliminating the responsibility for linen accountability from professional personnel in named general hospitals, while an example of standardization and simplification is the Hospital Admission Procedure now being installed in all zone of the interior installations with a daily admission rate of ten or more patients. Both procedures are designed to save time and personnel, and preliminary tests have demonstrated they will do so to a greater extent than was anticipated.

As procedures are developed, they will be given extensive field tests, following which they will be released for general use through the medium of a loose-leaf manual, the first section of which will be distributed in the near future.

1. ASF Circular No. 395, part 2, section 3, 2 December 1944.



Blood collected from donors at 15th General Medical Laboratory near Naples, Italy. 6 September 1944. Signal Corps photograph.

### TUBERCULOSIS IN THE ARMY

The incidence of tuberculosis, as reflected by the annual hospital admission rate, is only one-tenth as high in the Army as it was in the last war. The principal factor in the decrease is the screening process which excludes men with active or potentially active tuberculosis before they are inducted, Colonel E. R. Long, chief consultant on tuberculosis, The Surgeon General's Office, pointed out; another reason is that among civilians tuberculosis is only one-third as prevalent now.

Technical equipment had not been developed for quick and accurate detection of this disease in the last war. By means of x-ray photography tuberculous cases now can be excluded with great accuracy. This screening process came to be used universally in the Army in the spring of 1942. Nearly one million men were inducted without this x-ray examination, which to a large degree accounts for the 10,500 men discharged from the Army because of tuberculosis between 7 December 1941 and 7 December 1944.

Since the beginning of the present war, the Army has rejected about 150,000 men who showed signs of pulmonary tuberculosis. Several thousand others were excluded by local boards of the Selective Service System before they reached induction centers. The x-ray photographs of all men inducted in the Army are kept on file. X-rays are always taken also when Army personnel are discharged. The rate of discharge is low for young inductees. The tuberculosis rate for men over 40 is eight times as high as for those under 20 years of age. The rate overseas is lower than in the homeland, largely because those who have this disease were weeded out before being sent to a combat theater.

About 1,750 beds are available for the care of tuberculous patients in Fitzsimons General Hospital, Denver, and Bruns General Hospital, Santa Fe. The Veterans' Administration has nineteen tuberculosis hospitals for veterans of the World War and the present war and has additional facilities for tuberculous patients in its general hospitals. Colonel Long said that the Army's system of handling these cases, which is also in effect in our other armed forces, represents an outstanding contribution to the national program of tuberculosis control.

The tuberculosis control program of the armed forces has attracted the attention of the military and public health services of foreign countries, delegations from several of which have come to this country to observe the program.

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**Leprologists.**—At the request of the Office of Coordinator of Inter-American Affairs, the Leonard Wood Memorial (American Leprosy Foundation, 1 Madison Avenue, New York City) has undertaken the responsibility of selecting key leprologists in South and Central American countries and bringing them to the United States for one year's special training. The president of the Leonard Wood Memorial has been made consultant to the Secretary of War on epidemic diseases.

### THORACOABDOMINAL WOUNDS\*

The management of abdominal and thoracic wounds has long been a challenge to surgical skill and judgment. Considerable controversy exists on technical detail on surgical procedures involved, and especially on the type of approach, that is, abdominal or thoracic. A recent report from the Surgical Consultant of NATOUSA giving the experience of an evacuation hospital over a twenty-two-months period comprising 1,210 patients with wounds and injuries of the chest is of particular interest. Among these patients, 103 had coexisting wounds of the chest and abdominal cavity, two of whom died prior to operation.

The choice of approach to the abdominal injury was left to the judgment of the surgeon. Experience with this group of cases, as revealed by a study of their postoperative course, fails to substantiate the claims of those who strongly advocate one approach as preferable to the other. Forty thoracoabdominal wounds were treated by thoracotomy (all procedures carried out through the chest incision) with 10 deaths (25 percent). Fifty-four thoracoabdominal wounds were treated primarily through the laparotomy incision with 17 deaths (31 percent). Six thoracoabdominal wounds were treated through a double approach with 2 deaths (33 percent).

An analysis of abdominal wounds being cared for in the same hospital reveals the high mortality that accompanies multiple abdominal visceral wounds. The figures indicate that mortality is in direct proportion to the number of viscera involved. The mortality figures indicate a higher death rate than those from abdominal wounds without involvement of the chest. But on comparison with similar upper abdominal injuries there is no remarkable difference.

If an abdominal approach is used when perforation of the diaphragm may be present, it is essential to have an intratracheal tube in place. The sudden collapse of a lung from a sucking diaphragmatic perforation has been observed to cause death on the operating table.

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### TRAINING FILM—"INTRODUCTION TO COMBAT FATIGUE"

The War Department has announced the release of a new Medical Department training film, TF 8-1402, "Introduction to Combat Fatigue," intended for use in group psychotherapy. Produced by the Navy, which sent camera crews into the Southwest Pacific Theater to film the scenes in a realistic battle setting, this picture involves a vivid discussion of fear and means of controlling and turning it to the use of the soldier under fire.

The new film is required for all Medical Department personnel in Army Service Forces installations, and is to be shown when practicable in wards and centers where group psychotherapy is practiced. Distribution is made by the Signal Corps.

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\*From the Surgical Consultants Division, Office of The Surgeon General.

### NEW LINEN CONTROL AND DISTRIBUTION SYSTEM

Tests were made at Lawson, Finney, and Northington General Hospitals during the summer and fall to determine the feasibility of adopting a new linen control and distribution system developed by The Surgeon General's Office. The tests proved the system was eminently satisfactory, and as a result, ASF Circular No. 395 was published 2 December 1944, directing the installation of system at named general hospitals.

The benefits derived from this linen control and distribution system include the elimination of (1) multiple counting and checking of soiled and clean articles of linen, (2) positions, thus reducing personnel and expense, (3) the practice of hoarding linens in wards, clinics, and departments against a possible future linen shortage, (4) stocks of linens in wards, clinics, and departments in excess of the quantity that will supply their needs, (5) loitering of ward personnel in linen exchanges, halls, and on ramps, thus permitting their remaining at posts of duty, (6) useless records that indicate linen losses but never recovery of such losses, and (7) the use of production employees to obtain figures of doubtful value.

In addition, the new system provides (8) the means and incentive of securing an accurate inventory of linens, (9) a method of recording accurately the amount of linen replacement, (10) consolidation and centralization of linen accountability in one officer and one department and provides that officer with implements of control, (11) removal of the incentive to hoard, borrow, or steal linen from another activity, and (12) definite responsibility for providing an adequate supply of clean linen for all hospital activities.

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From the Hospital Division of The Surgeon General's Office.

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### EXAMINATION FOR REGULAR CORPS U. S. PUBLIC HEALTH SERVICE

An examination to establish eligibility for appointment as medical officers in the grade of assistant surgeon (first lieutenant) and senior assistant surgeon (captain) will be held on the dates specified below. An applicant for assistant surgeon must be a citizen of the United States, a graduate of a recognized medical school, and must have completed or be in the process of completing one year of internship or its equivalent. An applicant for senior assistant surgeon must meet requirements for assistant surgeon and have had in addition at least four years of professional training or experience.

Assistant surgeons receive \$3,411.00 per annum with dependents and \$2,975.50 per annum without dependents. Senior assistant surgeons receive \$3,991.00 per annum with

dependents and \$3,555.50 per annum without dependents. Appointments in the Regular Corps are permanent in nature. Promotions are at regular intervals up to and including the grade of medical director (colonel). Promotion, pay, and retirement schedules are essentially the same as those of the Medical Corps of the Army. Opportunity is afforded for assignment in a wide range of professional activity including hospital, research, and public health duty.

The board of examiners will be in the following places at 9:00 a.m. on the following dates. Candidates should arrange to have their physical examination completed at any one of the listed places on or before the date shown.

5, 6 Feb.	—Boston (Brighton)—Marine Hospital, 77 Warren Street
7, 8, 9, 10 Feb.	—New York (Stapleton, Staten Island)—Marine Hospital
12, 13 Feb.	—Washington—USPHS Dispensary, Fourth and D Streets, SW.
14, 15 Feb.	—Baltimore—Marine Hospital, Wyman Park Drive and 31st St.
16, 17 Feb.	—Norfolk—Marine Hospital, Hampton Boulevard-Larchmont
21, 22 Feb.	—Savannah—Marine Hospital, York and Abercorn Streets
23 Feb.	—Atlanta—Malaria Control in War Areas, 605 Volunteer Bldg.
26, 27 Feb.	—Cleveland—Marine Hospital, Fairhill Road and E. 124th Street
28 Feb.	—Detroit—Marine Hospital, Windmill Pointe
1, 2, 3 March	—Chicago—Marine Hospital, 4141 Clarendon Avenue
5 March	—Washington—USPHS Dispensary, Fourth and D Streets, SW.
12, 13, 14 March	—Kirkwood (near St. Louis)—Marine Hospital, 525 Couch Ave.
15 March	—Louisville—Marine Hospital, Portland Avenue and 22d Street
16 March	—Lexington—USPHS Hospital, Leestown Pike, Lexington, Ky.
17 March	—Memphis—Marine Hospital, Delaware and California Streets
19, 20 March	—Fort Worth—USPHS Hospital
21, 22 March	—Galveston—Marine Hospital, 45th Street and Avenue N
23, 24 March	—New Orleans—Marine Hospital, 210 State Street
26 March	—Mobile—Marine Hospital, St. Anthony and Bayou Streets
28 March	—Washington—USPHS Dispensary, Fourth and D Streets, SW.
3, 4 April	—Los Angeles—USPHS Relief Station, 406 Federal Building
5, 6, 7 April	—San Francisco—Marine Hospital, 14th Avenue and Park Blvd.
10, 11, 12 April	—Seattle—Marine Hospital, Judkins St. and 14th Ave. South
16 April	—Minneapolis—Office of Indian Affairs, 218 Federal Building
18 April	—Washington USPHS Dispensary, Fourth and D Streets, SW.
23, 24, 25 April	—Written examination

Individuals who complete the physical examination and certain other portions of the examination will be permitted to take a three-day written examination beginning 23 April 1945, either where the physical examination was conducted or at some nearer point.

Application blanks may be obtained from the Surgeon General, U. S. Public Health Service, Bethesda Station, Washington 14, D. C. These forms may be filled out and delivered to the Board of Examiners or may be obtained from the board at the time the applicant appears before the board. Applicants wishing to use National Board grades in lieu of written examination should present their certificates to the board. Applicants should bring their medical school diplomas with them.



**PENICILLIN IN THE TREATMENT OF VINCENT'S STOMATITIS**

A study of penicillin in the treatment of Vincent's stomatitis was made at the hospital, Lowry Field, Denver, from 15 April to 17 June 1944, at the request of the Air Surgeon. Various methods of penicillin administration were tried in patients exhibiting a typical clinical and bacteriologic picture of Vincent's stomatitis. One of the most positive means of effecting a cure was as follows:

The ulcer areas were dried and drops of concentrated penicillin (100,000 units per cc.) applied to them. After two minutes, 6 cc. of spray containing 300 units per cc. were applied. In the concentrated solution 20,000 units were used, making a total of 21,800 units per treatment. Before each treatment, the mouth was sprayed with water to remove the debris. The treatment was given at four-hour intervals, three times during the day. Thirty-two patients (with Vincent's stomatitis) were treated, using an average of 116,875 units of penicillin to effect a cure (most used—210,000 units; least used—48,000 units), while the average time required to effect a cure was 46 hours (longest time—72 hours; shortest time—24 hours).

Smoking was not curtailed in these patients, nor were there any dietary changes instituted. Penicillin apparently had no irritating effect on the tissues of the mouth, nor were there any systemic reactions.

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Abstract of paper by Lieut. Colonel Carlos F. Schuessler, D.C., and Major James M. Fairchild, D.C., submitted through The Surgeon General's Office to the Journal of the American Dental Association.

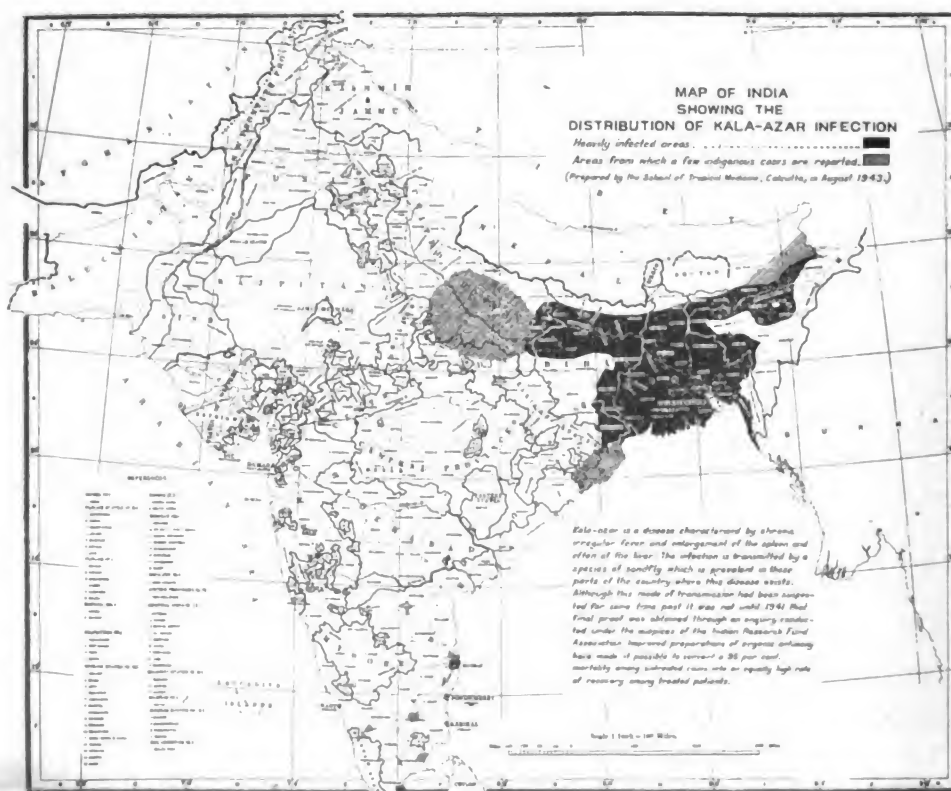
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U. S. Army dental clinic in Australia. 20 November 1942. Signal Corps photograph.

## FILARIASIS

During the past summer, about 750 patients with a diagnosis of filariasis were returned to the homeland from overseas. These patients were hospitalized first at Wakeman General Hospital and then at Moore General Hospital where the Army center for tropical diseases is located. They were thoroughly examined and observed. In only two instances were microfilariae found in the blood, and in these cases the microfilariae were present only for short periods of time and in very small numbers. Practically all of the patients were able to enter at once a special reconditioning program. Improvement in morale was striking. One-half the number of the patients have already been returned to duty as demonstration troops in the training program at Camp Hood, Texas. Only three of these have had a relapse. In accordance with regulations, all patients with a diagnosis of filariasis are disqualified for overseas service, but they may perform any duty in this country. The remainder of these patients are still in the special reconditioning program at the Moore General Hospital, where they will remain until they have passed a three-months period without the early symptoms of filariasis ("mumu"). Only twenty from the group of 750 have been discharged on certificate of disability, and these have had duodenal ulcer, flatfoot, severe psychoneurosis, or some other condition beside filariasis.



### FIELD TEST OF RATIONS

Six companies of a battalion of an infantry regiment, during June, July, and August 1944 at Topside in the Pike National Forest, provided a comprehensive field test of U. S. Army C, K, 10-in-1 rations and Canadian Army mess tin ration under the direction of officers of the Armored Medical Research Laboratory. Comparison was made with a supplemented field ration B. The test was carried out under conditions simulating the type and degree of activity likely to be encountered in combat. Each company went through the same schedule of training, exercise, and marches. The men were isolated from any source of food other than the ration tested, and their activity was controlled by the officers who ran the test. Information on likes and dislikes, individual component and calorie consumption, and food waste was obtained by questionnaires. Physical fitness was determined by the Army Ground Forces Test, Army Air Forces Test, and the Harvard Step Test. Results from these tests were compared with ratings of fitness given by the company officers.

The results indicate that the new expeditionary rations as now constituted are generally highly acceptable. M-1, -2, and -3 and old C biscuits were rated poor. Improvements in the K ration when ample variation was provided indicated that it was satisfactory emergency ration. In general, bouillon, many of the biscuits, and lemon powder rated low. The 10-in-1 ration was satisfactory, but improvements in the noon meal were suggested. All confections, jam, and sugar were rated high.

The calorie intake in the neighborhood of 4,000 a day was in good agreement with the measured calorie expenditure. Most men lost weight during the test. This was more marked in the heavy men. Some light men gained weight. Physical fitness, performance in marches, and morale improved in all companies on all rations during the test. Rifle firing ability showed slight improvement. Nutritional examination and biochemical studies gave no evidence of any nutritional deficiency in men on the test rations. Besides recommendations made to eliminate particular components from several rations and improve them by specific measures, it was concluded that packaged rations did not make any provision for variation in calorie requirement, such as occurs because of difference in size and work output among individuals.

It was recommended that the basis of issue be increased and that all packaged expeditionary rations have maximal variety in each standard bulk package so that a particular unit would be fed a ration containing all the possible variety. Introduction of jam and introduction or increased issue of canned milk were recommended. It was emphasized that every effort would be made to have rations consumed in as fresh a state as possible.

**FOREIGN QUARANTINE IN INTERNATIONAL ARMY TRAFFIC**

Following extensive investigations conducted jointly by the Army, the Navy, and the United States Public Health Service through the Interdepartmental Quarantine Commission during 1943 and 1944, a complete program of foreign quarantine has been undertaken in international Army traffic. Quarantines are ordinarily responsibilities of the United States Public Health Service, the Bureau of Animal Industry or the Bureau of Entomology and Plant Quarantine of the Department of Agriculture, and the Fish and Wildlife Service of the Department of the Interior. Parallel responsibilities are similarly assigned in most other countries. Agreements in principle and in detail have been reached by the Army and civil agencies concerned in the United States, permitting the most effective and economical employment of personnel and facilities and taking full advantage of the character of military traffic. Such advantages accrue from the extensive military program of prophylactic immunizations, the continuous medical supervision exercised over all personnel under military jurisdiction, and the extensive program of sanitation within and surrounding military bases both in this country and abroad. Cognizance is also taken of the sanitation of military conveyances, including the disinsection of aircraft, and of restrictions required, in military interest, to be placed on personal baggage and cargo.

A Quarantine Branch has been established in the Preventive Medicine Service of the Office of The Surgeon General, in charge of the Army Quarantine Liaison Officer. It is intended that close contact be maintained with all echelons of the Army concerned with international movement of personnel or material, and civil agencies concerned in the United States and abroad in order to obtain the widest possible acceptance of U. S. Army principles in foreign quarantine throughout military traffic.

Directives published to establish the Army program in foreign quarantine include AR 40-225, Medical Department, Foreign Quarantine, dated 21 November 1944, War Department Circular No. 453, Foreign Quarantine, dated 29 November 1944, and Army Air Forces Regulation No. 61-3, dated 9 August 1944. These must be considered in conjunction with certain other War Department directives, including AR 40-210, Medical Department, Prevention and Control of Communicable Diseases of Man, dated 15 September 1942, AR 615-250, Physical Inspections, dated 24 July 1942, and publications concerned with medical preparation and processing of personnel in international traffic. It is the intent of the new program to facilitate military traffic by taking advantage of otherwise necessary processing; additional requirements are avoided so far as possible.

### FROZEN MILK FOR HOSPITAL SHIPS

The milk furnished on hospital ships is pasteurized, homogenized, and kept in a frozen condition until thawed for use. To save space, attempt was made to use a frozen concentrated milk which was to be reconstituted on board ship by the addition of water after thawing. Such milk was not satisfactory, as it is difficult to reconstitute it in a sanitary manner and it frequently develops an abnormal flavor when stored for short periods. Frozen milk in 5-gallon cans was also used to some extent but was discontinued because of health hazards encountered in the use of bulk milk.

Specifications for pasteurized frozen milk have been approved and are about ready for distribution. They permit the use of only fresh milk which meets the specification requirements for Type II pasteurized milk, and require that the milk shall be properly homogenized, packaged in rectangular paper containers having a capacity of one quart, and frozen solid within not more than twenty hours. The milk will be purchased by the quartermaster and will be produced, processed, and handled under the inspection of the Veterinary Corps. The procurement of milk under these specifications will ensure that safe milk of good quality is furnished to hospital ships.

Packaging the milk in paper quart containers not only permits the milk to be thawed as needed but thawed without exposure to contamination. Some separation of fat and casein takes place in milk when it remains frozen for a prolonged period. Reports, however, show that milk meeting these specifications has been very favorably received by patients on hospital ships after it had been stored for three months.

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From the Veterinary Division, Surgeon General's Office.



Unit aid station in Forêt de Grémecy, near Nancy, France. The wounded received temporary aid here before being sent to hospitals in rear areas. 8 November 1944. Signal Corps photograph.

### TRANSMISSION OF PRIMARY ATYPICAL PNEUMONIA TO HUMAN VOLUNTEERS

Studies conducted in the fall of 1943 by the Commission on Acute Respiratory Diseases of the Army Epidemiological Board indicated that the syndrome of atypical pneumonia could be reproduced in certain human volunteers by inoculation with unfiltered throat washings and sputa from characteristic cases of this disease. During the past summer the Commission repeated these studies with 42 conscientious objector volunteers each of whom was inoculated with 10 cc. of a mixture of sputum and nasal washings from cases of experimentally produced atypical pneumonia. The material was sprayed into the nose and throat by means of an atomizer and vaporizer. The 42 volunteers were divided into three groups: the first group of 18 men received material which had been autoclaved; the second group, composed of 12 men, received material which had been passed through a bacteria-restraining filter; and the remaining 12 men received untreated material.

Three patients receiving filtered material and 3 receiving untreated material developed characteristic symptoms, signs, and x-ray evidence of primary atypical pneumonia. No individual inoculated with autoclaved material was similarly affected.

The onset of the disease in the 3 patients receiving filtered material occurred on the 12th, 13th, and 14th days, respectively, after inoculation. Onsets occurred earlier in the 3 patients receiving untreated material, two developing on the 7th day and one on the 8th day after inoculation.

Cold agglutinins developed in the sera of 5 of the 6 cases of pneumonia. In no case was a rise in titer of agglutinins for an indifferent streptococcus demonstrated. Cultures of the throat sputa and throat washings of these cases yielded no indication of a direct etiological relationship between any single organism or group of organisms and atypical pneumonia.

In addition to the 6 cases of atypical pneumonia, there were 11 cases of minor respiratory illness distributed as follows: in the group receiving autoclaved material, 1 case; in the group receiving filtered material, 5 cases; and in the group receiving untreated material, 5 cases. The volunteer, in the group receiving autoclaved material, who developed a minor respiratory illness after having received autoclaved material was the only volunteer, as far as could be determined, who broke isolation; on at least one occasion he descended a fire escape to converse with a member of another group who subsequently developed "suspected atypical pneumonia."

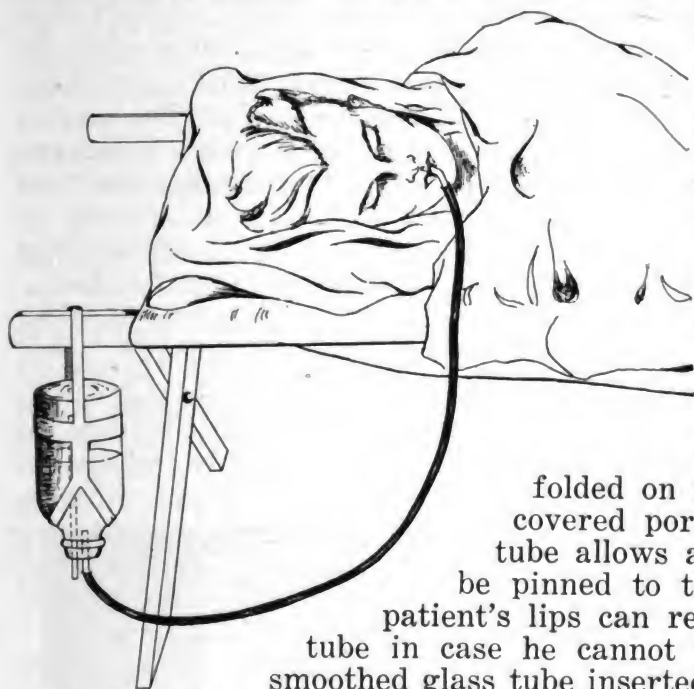
This experiment thus demonstrated that bacteria-free filtrates, presumably containing a virus, can induce primary atypical pneumonia in man.

Abstract of a paper submitted through The Surgeon General's Office for publication in the Journal of the American Medical Association.



### SIMPLE METHOD OF ADMINISTERING FLUIDS ORALLY

The nursing staff of the Eighth Evacuation Hospital has devised a simple method of administering fluids by mouth to debilitated patients. Invert a used Vacoliter bottle from intra-



venous infusions and suspend it from the outer tip of the head crossbar of the U.S. Army cot. By attaching a rubber tube to the shorter glass tube of the Vacoliter bottle, a recumbent patient can drink by exerting the slightest suction. A short strip of adhesive partially

folded on itself with the uncovered portion encircling the tube allows a nonsticky flap to be pinned to the bedding so the patient's lips can reach the tip of the tube in case he cannot use his hands. A smoothed glass tube inserted into the drinking end of the rubber tube prevents collapse on suction.

Since the fluid level in the bottle is below the surface of the cot, no clamping of the rubber tube is required and no leaking can occur as long as the drinking tip remains at cot level. A liter of fluid in a graduated bottle is available and thus a record of fluid intake can be kept.

Patients find this method easier than drinking from a glass tube and tumbler or from a teaspoon, and they will consume gratifying quantities of fluid with less effort on their part as well as on the part of the nurse.

### SURGERY OF THE HAND

Dr. Sterling Bunnell of San Francisco has been appointed surgical consultant to the Secretary of War. He reported to Washington on 30 November 1944 and will visit certain hospitals in each service command in connection with surgery of the hand. His first tour included Cushing General Hospital, Thomas M. England General Hospital, Valley Forge General Hospital, Newton D. Baker General Hospital, and Wakeman General Hospital. Surgeons from each general and regional hospital attended Dr. Bunnell's clinics. He will visit the other service commands later. Dr. Bunnell's recent book, "Surgery of the Hand," is standard item No. B718390, listed in Section 2, Change 1, Med 3, Medical Supply Catalog.

### MULTIPLE BLOOD-TYPING TECHNIQUE

A special blood-typing technique, which is said to save manpower and to have been successfully used in thousands of cases, has been submitted by Major Daniel H. Deyoe, M.C., of Fort Dix. The slide is made from clear window glass  $2\frac{1}{2}$  inches wide by 10 inches long on which the lines are drawn with a drafting pen using white shellac colored with gentian violet. The circles

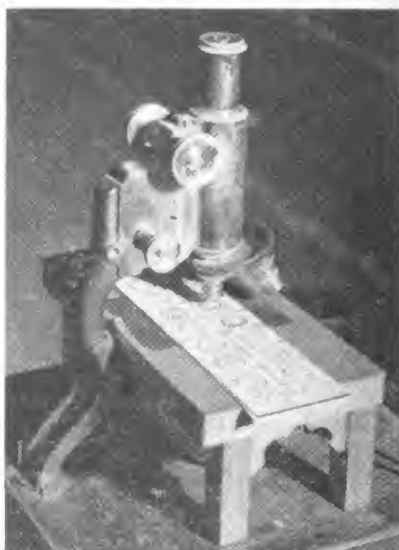
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10	

are drawn freehand with a ball-point straight pen. The circles may be drawn first in pencil on a strip of paper the size of the glass slide, using a penny as a guide to draw the circles.

This paper is then placed under the glass for a guide in marking the lines and circles. The shellac dries in a short time.

The divisions, numbered in multiples of ten, 1-10, 11-20, etc., are set up with blood-typing antisera A (blue) and B (red) in the usual manner. The sera are then mixed with a suspension of the blood of ten patients and, after standing for ten minutes, are read with a microscope.

To prevent tipping of the multiple slide on the microscope stage, a wooden stage was devised to increase the area on which the slide rests. This allows the examiner to move the slide readily without danger of tilting. The added stage is made using a thin plywood top covered with scrap felt from an old pool-table cover. After a slide has been read, it is immersed in cold water; when a number of them are thus collected, they are rinsed with water, blotted dry, and set up again for another series. With care these mounts last for months. If portions of the shellac become marred, repairs can be made with a pen. The entire slide may be wiped clean using alcohol on a cloth and then a new mount can be made on the old slide.





## NOTES FROM HOSPITALS IN NORMANDY AND ENGLAND

*Head and nerve injuries in Normandy* were sent, as far as possible, to specially selected units in British and American sectors and to special hospitals in England. Cases were operated on in France only when obviously urgent with signs of increasing pressure, extradural bleeding, subdural hematomata, or small penetrating wounds which did not have adequate decompression. When operation was done in France, it was a complete operation. An operation of "expediency" is frequently worse than leaving the case untouched. A good rule in the field is "Do all or nothing"; both United States and British brain surgeons had the same rule.

The mortality at the British head center visited in France was high, nearly 40 percent, but cases were seen very early and many who died there would not under ordinary battle conditions have reached a head center at all. Postoperative nursing of head cases presented a very considerable problem. They needed a larger nursing staff than a similar number of ordinary cases.

The U. S. specialist in brain injuries, mentioning the difficulty of treating *B. coli* meningitis, told me that large doses of sulfonamides combined with large oral doses of urea had been very beneficial. The blood urea should be brought up to 50 mg. percent. They had also used injections of penicillin solution.

Nerve injuries from concussion by a high velocity bullet passing close to the nerves were relatively common. If faradic response persists, they usually make a good recovery, but no signs of recovery may be apparent for four to five weeks. Nerve repairs are done as early as possible, depending on the cleanness of the wound.

*Open wounds.* The policy in all wounds is to get them ready for secondary suture, skin grafting, or plastic surgery as soon as possible; wounds remain clean only when they are epithelized, and the policy is to review wounds frequently to see how soon one or other of these procedures can be adopted. If a wound is not grossly infected, it should be closed; in fact, I was told that the presence of *B. welchii* was not an absolute contraindication to closure. At one general hospital I was told that out of 800 secondary closures they had done in periods varying from three to eighteen days there had only been six which broke down. If the wound is granulating, it should not be stitched tightly, but if it has been excised, the edges can be tightly stitched together.

At another general hospital they had considerable success in preparing dirty wounds for suture by treating them with a solution of 87 percent urea and 13 percent sulfanilamide. It removes necrotic tissue very rapidly and urea also has the effect of increasing the solubility of sulfanilamide. They stated that use of this solution would remove sloughs in two to three days.

Extracts from impressions gathered in July and August 1944 at field installations in France and England by Colonel F. S. Gillespie, British medical liaison officer, Medical Field Service School, Carlisle Barracks, Pennsylvania, and published in his Circular Letters Nos. 14 and 15, dated 23 September and 13 October 1944, respectively.

*Blood supply depot Bristol.* The blood supply depot still recommends that whole blood should be given in the proportion of 1 pint to 3 of plasma. Some Rh incompatibilities were met with after repeated transfusions; some react after the fourth transfusion and others not until they have had as many as twenty. This was overcome by giving Rh negative blood. It is difficult in battle casualties to get the hemoglobin up to 100 percent, and 80 percent is usually adequate for postoperative or traumatic cases, although a higher level is advisable for septic cases.

Cutting down on veins in transfusions should not be done if it can possibly be avoided.

One problem arising from shipping whole blood is that the criteria of the suitability of blood for use is that supernatant plasma should be clear; because of shaking, some blood cells may get up into the supernatant plasma and may take several days to settle down again. If this occurs, a test tube full of blood can be taken from the bottle, shaken up, and centrifuged, and if after this the plasma is clear, the blood is considered safe for use. Brigadier General Whitby, head of the blood supply depot, is of the opinion that there has been too much of a swing in favor of blood as against plasma. Inexperienced surgeons will always tend to use blood in preference to plasma if it is available. A patient may look splendid after a large blood transfusion and may be sent to a base unit with the forward surgeon very satisfied with his efforts, but he does not see the patient when he develops jaundice, anuria, or oliguria. These might have been avoided by a judicious mixture of blood and plasma, one of stored blood to two of plasma, or equal parts of fresh blood and plasma. Should these conditions arise, alkalization should be the aim in treatment. General Whitby's suggestions are borne out by experience of surgeons and shock research units in France and Italy.

*The medical group.* In the First Army, the three medical groups were set up with one composed of all collecting companies, one of all clearing companies, and the third with all ambulance companies, an arrangement which seemed ideal as the commander of each unit had one responsibility instead of having three. The medical group which has been evolved out of the old medical regiment seemed to be a most flexible and versatile organization. In the item in the December 1944 *Bulletin*, pages 22-25, the paragraph entitled "Collecting Company Group" was extracted from Colonel Gillespie's Circular Letter No. 14 from his notes on medical groups visited in France. The collecting company group, as herein indicated, was part of a medical group and not the "collecting company of a divisional medical battalion."

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#### CORRECTION

**The Cerebral Form of Malaria.**—In the paper by this title in the December 1944 *Bulletin* in the eleventh line from the bottom of page 40, the word "No" should have appeared before the words "Trained observers."

### PREVENTION OF TOE CONTRACTURES

In the treatment of fractures and other injuries of the upper extremity, immobilization of the finger joints by plaster splints, failure to prevent edema, and failure to mobilize all the finger joints by active exercises are common causes of disability and loss of function of the hand. This problem is recognized in connection with hand surgery. Lieut. Colonel Vernon L. Hart, M.C., A.U.S., at Fitzsimons General Hospital, has pointed out that there is a lack of appreciation that the same principles must be applied in treatment of injuries of the lower extremity in order to prevent toe contractures, pain, edema, and disability as in the case of the upper extremity.

Even long after bony union has occurred in fractures of the lower extremity, many patients continue to be disabled because of persistent edema, painful rigid clawing of the toes, and rigid deformity of the transverse arch with metatarsal heads convex towards the sole of the foot. The toes become rigid with hyperextension of the metatarsophalangeal joints because of adhesions, contractures of tendons and ligaments, muscle imbalance, and neglect of active toe exercises. Many patients have clawing of the toes in the normal extremity without pain or disability, but this may be explained

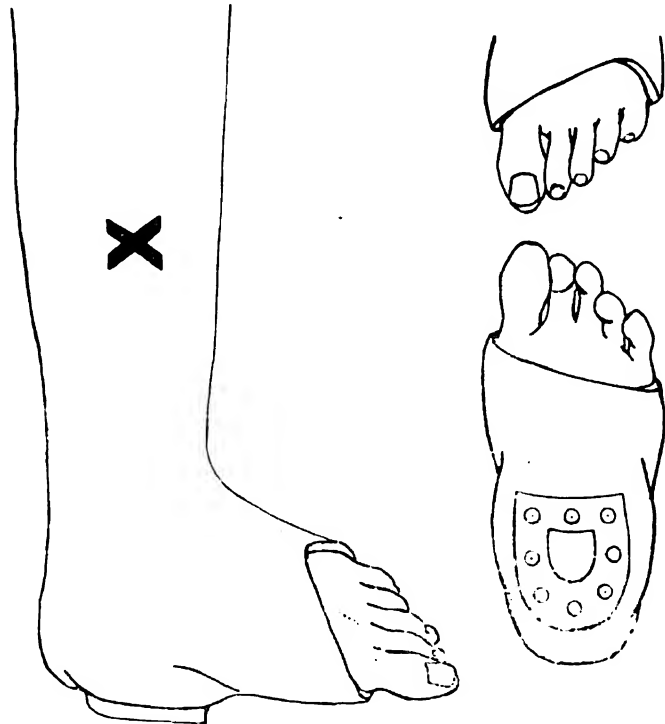


FIGURE 1. Illustrating the freedom of toe motion derived in plaster casts for the lower extremity. A wool sock is placed over the toes when patient is ambulatory.

by the fact that in the painful foot the clawed toes and the flat transverse arch are rigid while in the foot without pain they are mobile.

This complication can be prevented if edema is minimized by periodic elevation of the extremity and if a program of frequent active exercises for all joints of the toes is established. Toes cannot be exercised if they are immobilized by plaster. Extension of plaster beyond the ends of the toes is proper in a transportation splint or under special circumstances to protect

the toes from trauma but it is to be condemned in plaster casts following emergency treatment. If for any reason the toes must be protected after initial treatment, then a wire bow should be incorporated in the cast so it will prevent pressure on the toes and will at the same time permit free toe motion.

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#### ARMY WATER SUPPLIES IN THE UNITED STATES

Under the program of water quality control established by the Sanitary Engineering Division of the Preventive Medicine Service, less than 2 percent of the 20,000 samples of water per month now being examined are nonpotable. The essential steps in this program include: (1) the establishment of safe bases of design and their use by the Corps of Engineers; (2) sanitary surveys by Sanitary Corps engineers to determine such defects as actual or potential cross-connections, improperly protected wells, unsafe sources of supply, and hazardous practices; (3) the institution of adequate chlorination; and (4) the provision of routine regular bacteriologic examinations. The closest cooperation has been maintained with the Corps of Engineers, especially the Repairs and Utilities Branch. The actual performance of this program has been delegated to the service commands, which are responsible for the constant improvement that has been maintained. The service command sanitary engineer, who is a staff officer of the service command surgeon, supervises the work in the respective service commands.

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#### RECONDITIONING NOTES

One hundred students of the Army Occupational Therapy Emergency Course were placed in certain general hospitals about 1 November 1944 for a period of eight months' clinical training. These students had already had four months' training in civilian schools. Other courses are now being given and additional students will be assigned until the quota of 600 to be trained in this course has been filled. On satisfactory completion of apprentice's training, students will be eligible for registration as occupational therapists.

The School for Personnel Services is the new name for the School for Special and Morale Services at Lexington, Virginia, which offers two courses in reconditioning, the educational reconditioning course and the physical reconditioning course, the former for officers and enlisted men, the latter for officers only. Enlisted men qualifying in physical reconditioning are assigned to the A.S.F.T.C., Ft., Lewis, Washington, course for physical reconditioning instructors.

Reconditioning consultants of all service commands met on 1 and 2 September 1944 at Crile General Hospital, Cleveland, to review the progress being made in the field, clarify objectives, and discuss problems.

### HOT COOKED HOSPITAL FOOD

The conservation of cooked food has presented many difficult problems among which are those attributable to wartime hospital food transport equipment (Drinkwater food cart) which has replaced electrically heated equipment.

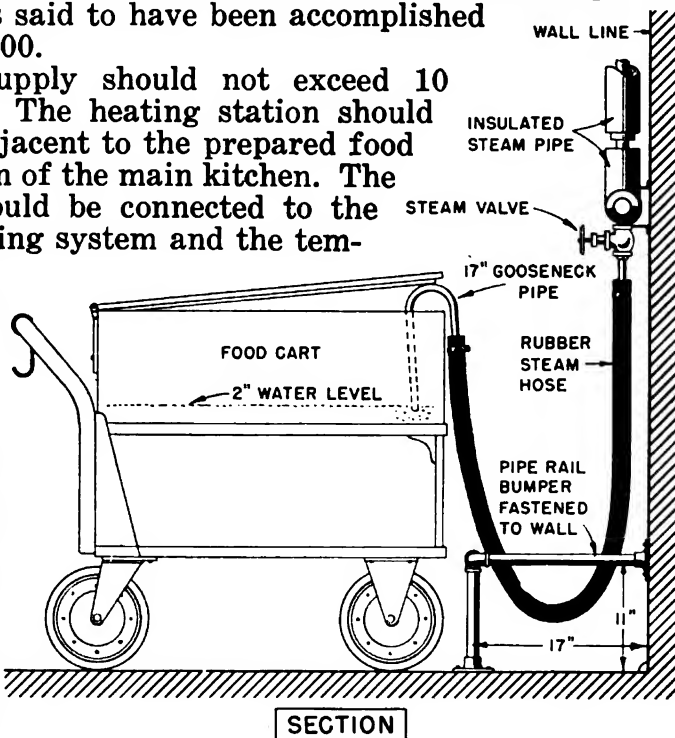
A solution to the problem of transporting large quantities of food from the main hospital kitchen to widely dispersed serving points has been found at Vaughan General Hospital, by the development of a low-pressure, live-steam heating station for Drinkwater food carts. The simplicity of design, low cost, and the use of readily available materials will make installation of similar food-cart heating stations possible wherever the need exists. The construction details are portrayed in the diagrams. This installation is said to have been accomplished for less than \$150.00.

The steam supply should not exceed 10 pounds' pressure. The heating station should be located next adjacent to the prepared food distribution section of the main kitchen. The water battery should be connected to the hot water circulating system and the tem-

perature of the water supply should be maintained above 160° F. This temperature can be increased to about 200° and controlled by the injection of live steam into the carts at the steam battery. The steam manifold of the steam battery should be trapped with an appropri-

ate low-pressure steam trap (preferably thermostatic type). This will ensure maintenance of a proper water level in the food carts by preventing discharge of condensate from the steam lines into the carts. All steam and return pipes should be covered to prevent burns to operating personnel, who should be provided with asbestos gloves. The guard rail which protects the steam lines should in no instance be omitted.

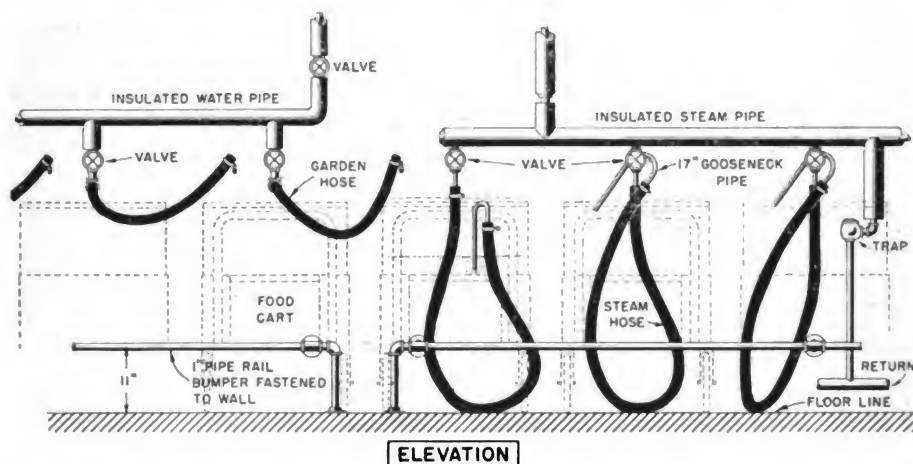
To prevent damage to food and injury to operating personnel, the operator of the steam battery should be carefully selected for his knowledge of prepared food conditioning and



Brigadier General Percy J. Carroll, commanding general, Lieut. Colonel Rosco Perkins, Jr., post engineer, First Lieut. Robert P. Heinz, M.A.C., director of dietetics, and Second Lieut. Francis P. Kelley, chief dietitian, collaborated in the development of these facilities.

instructed by a member of the post engineer's staff in the safe operation of live steam equipment. Operation of this unit should not be attempted by untrained personnel.

The unit described consisted of a battery of five live steam stations and three hot water stations which require one trained operator in each section. This arrangement proved very satisfactory for serving a 2,000-bed general hospital. The steam and hot water stations can be installed in multiples according to the demands of any hospital.



While it is essential that only the operator handling the live steam battery be trained, the training of both operators will provide more flexible personnel coverage in case of leave and labor turnover, and will permit employee training to start with assignment to the hot water battery, thus providing a productive outlet during the training period. Female employees may be assigned to this work.

#### WAC HOSPITAL TECHNICIANS URGENTLY NEEDED

The Army will continue to recruit for the Women's Army Corps in 1945. Since 1 January, the WAC recruiting program has emphasized the enlistment of qualified women urgently needed for duty in Army hospitals. Because of the return of thousands of sick and wounded soldiers to the United States each month, together with a critical shortage of Army nurses, the urgent need for several thousand medical and surgical technicians in Army hospitals continues. This need is acute and must be filled. Those enlisted in the WAC for this duty will receive special training as enlisted technicians and they are assured duty in Army hospitals, aiding in the care of sick, injured, and wounded soldiers. Other enlisted technicians needed by the Medical Department include pharmacists, laboratory technicians, dental technicians, and psychiatric social workers.

**FLUID INTAKE AFTER HEMOLYTIC TRANSFUSION REACTION**

Because water is the outstanding physiologic diuretic, the administration of fluids either parenterally or orally to stimulate urine secretion is generally employed when patients have oliguria or anuria as a consequence of intravascular hemolysis. Since the demonstration that alkalinity of the urine tends to prevent deposition of crystals of acid hematin in the tubules of patients excreting hemoglobin, it is a common practice to employ fluids containing alkalinizing salts.

Abundant evidence has appeared that not infrequently patients with injury of kidney tubules are harmed rather than helped by persistent efforts to secure diuresis by maintenance of fluid intake in excess of fluid output. In studies of the physiology and pathology of the severely wounded in NATOUSA, two facts have been demonstrated which have a bearing on this subject. One is that the patient with anuria tends to develop a marked plethora with a circulating blood volume far above the values for normal. Secondly, clinical and pathologic evidence indicate that pulmonary edema is an important cause of death. The danger of administration of fluid, particularly by vein, to patients with anuria is pointed out in two recent clinical articles: "A Plan for the Management of Anuria," by Capt. John K. Latimer, in process of publication, and "The Treatment of Anuria," published in the *New England Journal of Medicine*, 15 June 1944. The preponderance of evidence suggests that anuria following intravascular hemolysis is due mainly to injury to tubular epithelium and that obstruction of the lumen of these tubules by deposition of hematin crystals is of secondary importance.

There is good reason to believe that the best and sometimes only opportunity for successful use of diuretics in the treatment of hemolytic transfusion reaction is during a brief period following the onset of the hemolytic process. Maintenance of a vigorous flow of urine during the early hours of the disorder would have the following desirable effects: Prevention of concentration of harmful substances by the tubules. (1) Hemoglobin. Formation of casts derived from hemoglobin is dependent on concentration of hemoglobin in the urine as well as acidity. (2) Histamine or related substances released by the antigen-antibody reaction. (3) Other harmful substances resulting from destruction of erythrocytes.

If diuresis early in the condition is desirable, the choice of diuretic agents is important. Available information is not adequate for discriminating choice. Obviously all fluids are not equally diuretic. Alkalinizing fluids are not likely to have the maximum diuretic effect.

Therapy employed at the 24th General Hospital has two features which appear sound: (1) *Early use of a powerful diuretic*. Intravenous administration of 1 liter of isotonic 2 per-

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From the Medical Consultants Division, Surgeon General's Office.



cent sodium sulfate solution within a few minutes after the diagnosis of hemolytic transfusion reaction is made.\* (2) Fluid administration in excess of output by as much as 3,000 cc. *only* during the first twenty-four hours and mainly during the first twelve hours. *Thereafter, fluids are given strictly in accordance with demands of fluid loss.*

According to this plan after the early period of "forcing" of fluids the intake is determined entirely by the water output, measured and estimated as urine, feces, sweat, and vapor in expired air. Accordingly, when early measures result in diuresis, fluid intake is continued at a correspondingly high level, but if there is anuria, only enough fluid is given to cover water loss by bowel, skin, and respiratory tract. Under ordinary conditions the skin and respiratory tract together put out 750 to 1,000 cc. of water daily.

*The dangers of persistent administration of fluids in excess of output are apparent regardless of the cause of anuria or obliguria.*

\*The following sequence of events beginning during transfusion is diagnostic: (1) A sense of increased heat in the skin, (2) headache, (3) sense of constriction in the chest, (4) rigor, (5) fever.

#### DISINFECTION OF VEGETABLES AND FRUITS

In addition to its use for disinfecting mess gear where adequate amounts of hot water are not available, Compound Germicidal Rinse can be used to disinfect vegetables and fruits that are to be consumed raw. The following method should be followed.

1. After the removal of visibly soiled or damaged outer leaves (stalks of celery, heads of lettuce, cabbage, etc., are not to be broken or cut until after treatment), the vegetables or fruits are rinsed thoroughly in potable water.

2. Place the trimmed and rinsed vegetables or fruits in a clean container, cover with a germicidal rinse solution prepared by dissolving one unit (one package containing 3.36 ounces) of Compound Germicidal Rinse in about 8 gallons of potable water and allow to stand for thirty minutes.

3. After removal from the germicidal rinse solution, re-rinse the vegetables or fruits thoroughly in potable water.

4. The germicidal rinse solution should be discarded after each use and a fresh solution prepared for succeeding lots of vegetables that require treatment.

Compound Germicidal Rinse may be requisitioned from the quartermaster. It is officially known as Compound Germicidal Rinse, Stock No. 51-C-1606; shipments are made in double sealed cartons containing ninety-six units each.

From the Sanitation and Hygiene Division, Preventive Medicine Service, Surgeon General's Office.



(Army Medical Museum negative No. 83679)



### PROGRESS IN THE MEDICAL HISTORY PROGRAM

Colonel Albert G. Love, M.C., historian of the Army Medical Department, reports that plans have been made to complete the medical history of World War II six months after victory in the Pacific. Several officers are now assigned to the historical program, about one-half of them serving in overseas theaters. Most of these officers have graduate degrees in history from universities throughout the country and were commissioned in the Medical Administrative Corps following training in officer candidate schools. These officers are working on the administrative aspects of the medical service—supply, personnel, training, and hospital construction. The professional medical experience of the Army will be recorded by officers qualified in the various specialties.

The history of the Medical Department in the current conflict should therefore be completed within the estimated time limit. Previous histories published by the Medical Department appeared several years after the cessation of hostilities. Twenty-three years were required to complete the medical history of the Civil War; ten years, to complete that of the first World War. Early publication of the current history will be advantageous in that many of the advances in military medicine will be applicable in planning for national defense and civilian practice. Thus, much that the Army is learning today on the world's battle fronts is destined to reach the public while the knowledge is still fresh.

At a meeting of historical officers held in The Surgeon General's Office on 6 December 1944, announcement was made that sufficient volumes would be published to cover the entire scope of the Medical Department's professional and administrative work. Material for these volumes is rapidly accumulating. The Surgeon General and other authorities in the War Department are lending full support to the historical project.

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### REDUCTION IN THE MEDICAL CORPS OF THE ARMY

A moderate reduction in the number of Army Medical Corps officers is necessary in order to remain within presently allotted ceilings. The need for Medical Corps officers in senior grades who are assigned principally to administrative duties is less acute than formerly.

A board of officers in the Office of The Surgeon General is carefully considering the physical and other qualifications of Medical Corps officers of the various components of the Army and their essentiality to the war effort. As a result of this study, it is anticipated that a number of separations of officers of the above group will occur in the moderately near future. Regular Medical Corps officers will be accorded retirement privileges under the provisions of section II, AR 605-245, 17 June 1941, and Reserve, National Guard, and A.U.S. Medical Corps officers will be given the opportunity of returning to the practice of medicine in a civilian status by relief from active duty or discharge.

### A PORTABLE LIGHTWEIGHT FRACTURE FRAME

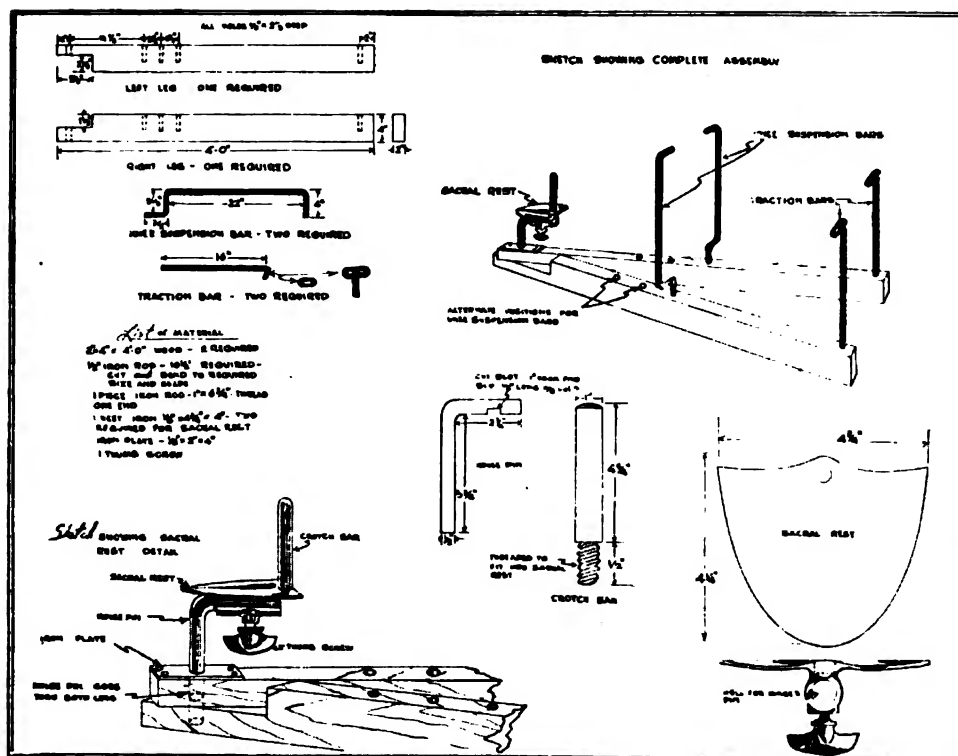
Reports of evacuation in jungle and mountainous areas stress the need of rigid immobilization of fractures of lower extremities. Patients with plaster casts tolerate long litter hauls over rough terrain or small craft evacuation over choppy seas better than when the Army leg splint is used. Installations in forward areas are unable to transport by hand cumbersome and complicated equipment. Collecting and clearing companies and portable surgical hospitals are not equipped adequately to apply body casts. A portable and adjustable traction device was designed to meet the needs for the application of body spicas and leg casts. The sacral rest is made from a salvaged D-handle, round-point No. 2 shovel which has been cut down to the specified size. To this, the hinge pin and the crotch bar may either be welded or joined as in the diagram.

There is less tendency for spinal flexion to occur with the trunk in the inclined plane than in the horizontal plane. The inclined position of the trunk with the lower extremities elevated permits the upper portion of the body to act as countertraction. The shoulders, sacrum, and heels must be maintained in the same plane, though not horizontal, by raising or lowering the distal end of the traction device.



FIGURE 1. Construction of device permits easy application of cast in all regions.

Submitted by Lieut. Colonel Durand Smith, Captain George I. Weatherly, Jr., and Captain Joffre V. Achin, all Medical Corps, A.U.S., and Second Lieut. Harlan Cordts, M.A.C., A. U. S.

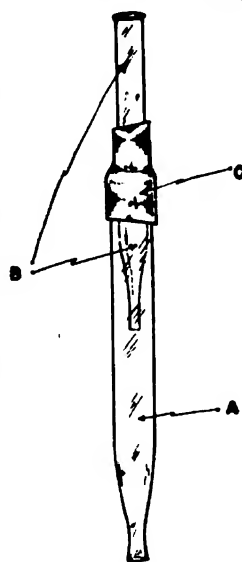


### INTRAVENOUS DRIP TUBE

For observance of rate-of-flow of intravenous fluids, either the Murphy drip tube (Med. Dept. Item No. 3872000) or the straight drip tube (Med. Dept. Item No. 3869800) may be used; however, these break easily when dropped or subjected to sudden changes in temperature. Captain Frederick G. Kirby, M.C., reports that, at a time when neither of these standard items was available, the apparatus described was used.

A piece of glass tubing about 6 inches long and 8 millimeters in diameter is drawn at one end to form a taper adaptable for fitting to rubber tubing. The glass portion (B) of the medicine dropper (Med. Dept. Item No. 7795000) is then introduced into the large end of the glass tubing (A) for about  $1\frac{1}{2}$  inches. At the junction of the two glass tubes, the joint is completed by a rubber collar (C)  $\frac{3}{4}$  inch long cut from rubber tubing.

After repeated trials, this simple apparatus has proved superior to the standard items because it is easier to clean and sterilize and, if broken, is much easier to replace.



### ABUSE OF MEDICAL DISPOSITION CHANNELS

It is believed that a strong tendency exists in the Army to use medical channels as a means of removing individuals who, although relatively noneffective, are not sick. A noneffective man is not necessarily sick; his noneffectiveness may be due to incompetence, unwillingness to expend effort, or other factors. To use medical channels for his removal not only is an abuse of such channels but may seriously undermine military discipline. The stress of combat is so severe that every man under fire has a desire to get out. There are only two channels by which this can be accomplished: the disciplinary and the medical. The disciplinary is for those who will not go on, the medical for those who cannot. To most men the disciplinary channel is not available because self-respect will not permit their using it. Medical evacuation is an honorable means of being removed so that self-respect presents no obstacle. To be eligible, the individual needs only a sickness or wound which renders him incapable of serving further. For this reason a great pressure is exerted constantly on medical officers to remove men from combat. In the face of heavy shellfire it is easy for a man to convince himself in all sincerity that he cannot go on. A slight wound or headache may immediately be brought to the attention of the medical officer, not so much for treatment as in the hope or sincere conviction that it is sufficiently serious to warrant evacuation. The medical officer quickly learns he must largely ignore what the patient says and evaluate the degree of disability almost exclusively on objective findings. This is relatively easy in surgical and medical conditions where objective evidence exists. Psychoneurosis and mental disorders present a far more difficult problem. A man may be completely disabled from a mental illness and yet show no objective evidence of pathology in the physical sense. A man who complains that he cannot stand further shellfire may be expressing an erroneous belief or the literal truth, and a great deal of skill and experience is required to evaluate the degree of his disability.

If the medical officer returns to duty men who are too sick, physically or mentally, to make the grade, he commits an injustice which robs other men in the unit of confidence in medical care and that is disastrous to morale. If he evacuates men who, although sick or nervous, could have carried on, he will soon have an epidemic of such cases on his hands. Other men compare themselves with the buddy who has been evacuated and conclude they, too, are sick enough to be evacuated. The inexperienced battalion surgeon or the overly sympathetic psychiatrist in evacuating these men not only removes effective manpower from the unit but opens wide the honorable escape from combat and perfectly good troops are soon pouring through. Once a man is evacuated from the combat area a

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From the Neuropsychiatry Consultants Division, Surgeon General's Office.

vicious circle is set in motion. His removal from the line and admission to the hospital confirms his belief in the seriousness of his condition. Unconsciously or otherwise, he has discovered that his illness is an asset in that it keeps him out of combat. In this way he actually does become ill, the symptoms become "fixed," and the man does become genuinely incapable of further combat duty.

Even more dangerous is another type of case which constitutes a major problem for the medical officer. This type consists of men who are noneffective in combat because of unwillingness to fight—the "gold brick," the coward, the disciplinary noneffective. These cases are often very difficult to distinguish from the true psychoneuroses. The unit commander may exert great pressure to have them evacuated through medical channels. They are of no value to him and cause constant trouble. To remove them through disciplinary channels involves time and effort which in combat can ill be spared. Furthermore, if a commander's courts-martial become numerous he encounters criticism from the higher command. It is important that medical officers refuse to evacuate these individuals even though they may be noneffective. He must return them to duty for disposition by the command. One of the most important functions of medical officers is to separate the "won'ts" from the "can'ts" and prevent abuse of medical evacuation as a means of escaping combat.

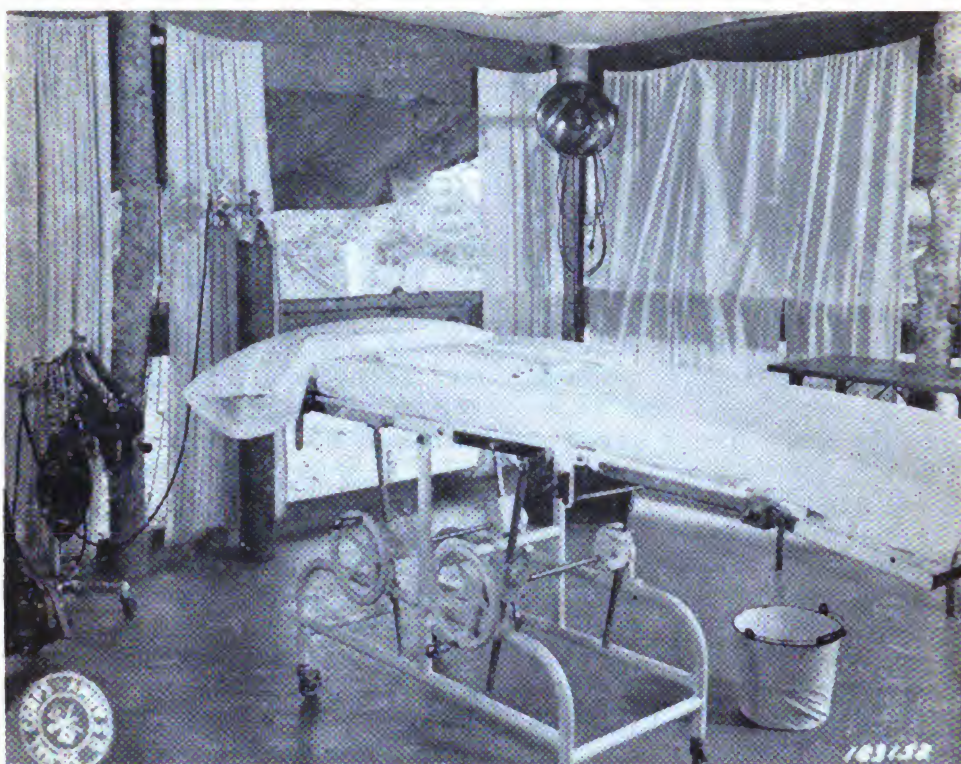
The issues involved are confused in the minds of some line officers, battalion surgeons, and psychiatrists. The terms "cowards," "gold brick," "psychoneurosis," mean different things to different people. The medicolegal aspect further complicates the problem. It is claimed by some officers that there is no such thing as cowardice any more in the United States Army. When a man runs from the enemy, before he can be court-martialed he falls into the hands of a psychiatrist who proclaims him not responsible for his acts on the grounds of psychoneurosis. Some line officers accuse psychiatrists of undermining the discipline of combat forces. The same line officers naturally are disturbed at the possibility of punishing a man who was truly out of his head at the time of the offense. The same line officers too often are the worst offenders in attempting to abuse medical channels to get rid of disciplinary noneffectives.

Many of these issues are believed to apply also to the problem of discharging individuals by C.D.D., Section VIII, or Section X, in the zone of the interior.

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**Army Medical Museum Seminars.**—Dr. Enrique Koppisch, professor of pathology, School of Tropical Medicine, Columbia University, and current resident consultant at the Army Institute of Pathology, discussed "Schistosomiasis" at the seminar at the Army Medical Museum, 2 December 1944. Dr. Robert A. Moore, professor of pathology, Washington University School of Medicine, St. Louis, discussed "The Mechanism of Cellular Recovery Following Treatment with Penicillin" at the seminar, 9 December 1944.





Operating room at a station hospital in South Pacific area.



Operating room at a station hospital in Australia.

### WATER PURIFICATION IN CHINA

Water supplies in China are notoriously bad with regard to almost all of the factors by which water supplies are judged. Water has been boiled before use, but because of the universal employment of coolies for handling the water, recontamination usually occurs before the water is used.

A number of the new diatomaceous earth filters, developed by the Corps of Engineers, Ft. Belvoir Laboratory, in cooperation with the Sanitary Engineering Division of the Preventive Medicine Service, Surgeon General's Office, have been flown to China and installed by Capt. C. W. Bovee, Sn.C., at a number of A.T.C. stations. Reports on the operation of these units indicate that excellent results are being obtained. Water is normally being produced that has a turbidity less than 1.0; ameba cysts are removed; after filtration, the water is chlorinated. In most places, a simple tank and piping system have been installed so that water is delivered under pressure to mess halls; provision is made for filling canteens and Lyster bags. In most of these installations, the water is coagulated and settled before filtering, as this greatly lengthens filter runs and saves diatomaceous earth. Both aluminum sulfate and lime (or soda ash) are available in China. The standard portable sand filter can produce good water with coagulation and settling, but unfortunately these procedures are seldom employed.

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From the Sanitary Engineering Division, Surgeon General's Office.

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Elevated view of Seagrave's hospital unit buildings. China. August 1943. Signal Corps photograph.



### DISSEMINATION OF DDT BY AIRCRAFT

The problems of adapting DDT to ordinary methods of larviciding and use as an adult insecticide with available commonplace equipment have been readily solved. The Army has been endeavoring to extend further the usefulness of this insecticide to inaccessible troops where the employment of ordinary methods of insect control is impossible or impractical.

Various possibilities have been exploited to determine the most practical and efficient means for airplane distribution. The technical skills of some of the foremost investigators in the United States have been available and much progress has been made, chiefly through the efforts of scientists of the Department of Agriculture, the Office of Scientific Research and Development, and other agencies. Projects under the Army Air Forces have been initiated to bring new developments to practical large-scale application. Investigations in this country and in overseas theaters have been coordinated by the Office of The Surgeon General. Ingenuity in adapting planes and materials in the field has enabled widespread use of airplanes to distribute DDT over important battle fronts and key installations. During the past malaria season in the Mediterranean, a squadron of planes with experienced pilots was maintained to effect rapid control of mosquitoes in newly occupied areas. Air spraying of DDT to reduce the hazard of insect-borne diseases has been employed in recent amphibious operations in the Pacific and has been included as an integral part of the malaria control program in Burma-India. Thus far the Army has avoided commitments on a single apparatus or method as a standard policy in the interest of determining the best method of attaining the desired end. Further experimentation and practical field tests are required before equipment can be standardized.

From the Tropical Disease Control Division, Preventive Medicine Service, Surgeon General's Office.



U. S. Army engineers pump water for front-line troops in France. Signal Corps photograph.

### THE MEDICAL SUPPLY CATALOG

The present ASF Medical Supply Catalog is a contemporary of other Army Service Forces catalogs published for military personnel concerned with the procurement, storage, issue, requisition, and use of equipment and supplies. A separate series of ASF supply catalogs—medical, chemical warfare, engineer, quartermaster, ordnance, signal, and transportation—is being issued to cover the material procured and issued by each of the seven technical services.

The supply catalog of each technical service is published in parallel sections having a similar purpose of content. Each section bears a distinctive identification consisting of the abbreviation for the initiating service (for example, MED, CW, QM), followed by a basic number identifying the content of the section. These sections are usually nine in number for the supply catalog of each technical service. They are:

MED 1, ORD 1, etc.: **INTRODUCTION.** This is a guide to all other sections of the catalog system of the originating service, with explanation of its content and use, requisitioning procedures, and other general information.

MED 2, CW 2, etc.: **INDEX.** This contains the identifying number and alphabetical listing of titles of each publication comprising the catalog system of the originating service.

MED 3, QM 3, etc.: **LIST OF ITEMS FOR ISSUE.** The MED 3 is comparable to the former Medical Department Supply Catalog less the former appendix which listed contents of chests, kits, and small assemblies. The former appendix is contained in MED 6.

MED 4, SIG 4, etc.: **ALLOWANCES OF EXPENDABLE SUPPLIES.** This is an AR-size pamphlet containing the basis of issue for expendable supplies.

QM 5, SIG 5, etc.: **STOCK LIST OF ALL ITEMS.** The Medical Department does not have this section of the catalog series. However, information which would normally be contained in MED 5 is found in MED 3 and MED 7.

MED 6, ENG 6, etc.: **SETS.** This section lists the components of all sets, chests, kits, and small assemblies. It is comparable to the former appendix of the Medical Department Supply Catalog. MED 1, 2, 3, and 6 are bound in one volume similar to the former Medical Department Supply Catalog. In addition, MED 6 is also issued separately to lower echelons than are provided for in distribution of the one-volume MED 1, 2, 3, and 6.

MED 7, CWS 7, etc.: **ORGANIZATIONAL SPARE PARTS.** This is another series of AR-size pamphlets, each one listing for each major item of equipment the current authorized list of spare parts, tools, and accessories for issue to 1st and 2d echelons.

SIG 8, QM 8, etc.: **HIGHER ECHELON SPARE PARTS.** No such publication is prepared by the Medical Department, as information normally contained in such pamphlets appears in MED 7.

MED 9, ORD 9, etc.: **LIST OF ALL PARTS.** The MED series of these pamphlets are now being prepared and each will list all parts necessary to service one major item, including parts not normally stocked or issued. Illustrations of these parts appear in this publication.

MED 10, SIG 10, etc.: **MISCELLANEOUS.** Sections numbered 10 and above may be issued as additional sections of the catalog system for each service, to include any necessary special or supplementary lists of items. These basic numbers usually have a different meaning peculiar to the catalog system for each service, and the Medical Department uses this section of the catalog for the various equipment lists.

With the change from the former Medical Department Supply Catalog, which was published, stored, and issued by the Medical Department, to the Army Service Forces Medical Supply Catalogs, which are published, stored, and issued by The Adjutant General, some confusion has occurred on the part of medical installations in the distribution of the catalog.

The initial distribution of any catalog or other technical publication, and any changes thereto, is an automatic issue based on the distribution formula set forth in each publication immediately following the authentication. This distribution formula consists of abbreviations and numbers which indicate the number of copies distributed to the organization listed. An explanation of distribution formulas may be found in FM 21-6. The automatic initial distribution for the zone of the interior of ASF Catalog 1, 2, 3, and 6, bound in one volume, and subsequent changes thereto, as well as other sections, is as follows:

The catalog is shipped from the printer to various Adjutant General depots in each service command in amounts to cover distribution in that depot's area for all organizations and activities of the type listed on the distribution formula. The number and kinds of these activities and organizations in a service command are available from reports prepared by The Adjutant General. The Adjutant General depot then breaks down the distribution to its various posts, camps, stations, depots, arsenals, etc., in quantities sufficient to permit issue of authorized allowances to headquarters, organizations, offices, and activities on the post, arsenal, etc., plus 10 percent additional for stock. These amounts are determined from troop and strength reports just mentioned. At each post or any location at which military activities are conducted, the post commander establishes one stock room which requisitions, receives, stores, and issues all publications and blank forms. The ASF Catalogs MED 1, 2, 3, and 6 are received at this stock room and thence distributed to all activities on that post listed in the distribution formula and in amounts indicated therein. Army Ground Forces and Army Service Forces headquarters, offices, organizations, and activities not covered by reference distribution formula either in sufficient amounts or no distribution, may, on showing the need, obtain catalogs in reasonable quantities by requisitioning (W.D., A.G.O. Form No. 17) on the post commander as prescribed in War Department Circular No. 264, 1944. Army Air Forces headquarters, offices, organizations, and activities should submit requisitions as prescribed by the Commanding General, Army Air Forces.

The automatic initial distribution for overseas installations is as follows:

The catalog is shipped from printer to publication sections at ports of embarkation again in amounts to effect distribution to activities listed in distribution formula for the number of such activities as are located in the theater served by the particular port. Three to fifteen copies of the ASF Catalog MED 1, 2, 3, and 6 are air-mailed to the commanding general of each theater for the attention of the Medical Department. Fifty additional copies are shipped to the same addresses by fast surface craft. All theaters receive a bulk shipment of the catalog by normal convoy. These bulk shipments are in amounts to cover initial distribution in accordance with the distribution formula in amounts based on reported troop strengths. This distribution within the theater is made very similar to that in the zone of the interior.



For further information regarding distribution of the catalog and future changes, attention is invited to A.S.F. Circular No. 199, 30 June 1944, War Department Circular No. 264, 28 June 1944, and AR 310-200 which is now being revised and will contain information essentially as is found in War Department Circular No. 264.



The large tent contains all equipment necessary for making roentgenograms in the field. The small tent contains darkroom equipment. Signal Corps photograph.



Medical supply hut used by a hospital in New Guinea.

**MEDICAL DEPARTMENT OFFICERS IN CIVIL AFFAIRS**

Medical Department civil affairs officers are now active in three theaters and seven countries—Italy, France, Belgium, Holland, Luxembourg, Germany, and the Philippines. They have, with a minimum of supplies and personnel, arranged for the care of civilian casualties, helped to reinstate and reorganize local public health departments, and have coped with threatened epidemics, depleted medical supplies, wrecked or absent sewerage and water systems, and other health problems incident to destitute refugees. They are doing a creditable job, thereby taking a burden from the regular medical services.

Civil affairs and military government are not new in the history of warfare. Caesar's occupation of Gaul was characterized by the appointment of cooperative local officials, retention of existing political subdivisions, and due respect for local religions and customs. Historians do not regard our earliest venture in this field in the war with Mexico (1846-1848) as having been highly successful. The Third United States Army was called on in 1918 to institute military government in the Rhineland with less than three weeks' preparation for the job. Fortunately for the success of the mission, there had been no destruction preceding occupation, hostilities had ceased, and there was no serious shortage of civilian supplies. The War Department early in the present war made civil affairs a military specialty, developed a training program, and organized the Civil Affairs Division as part of the War Department Special Staff. In the theaters of operation, civil affairs units are usually organized both at theater and lower echelons as a staff function (G-5). In all civil affairs organizations, public health is a major subdivision.

The operating unit for civil affairs in Northwest Europe is the civil affairs detachment, composed of legal, fiscal, communications and other officers, as well as medical officers and enlisted men. The detachments are organized for administrative purposes into companies, regiments, and finally into the European Civil Affairs Division (ECAD). In the Philippines, civil affairs units (PCAU's) are attached to the Sixth Army. Civil affairs units are usually attached to tactical organizations and move into an area along with the combat forces. In France, some civil affairs officers parachuted into their assigned area within the first few hours of active combat.

The mission of the civil affairs public health group is to prevent or control conditions which would hamper military operations through extension of disease to military personnel or by creating civilian unrest sufficient to disrupt essential services. There are also certain basic obligations which a military governing authority assumes under international law for the health of civilian populations.

The civil public health program must operate with a minimum of Army personnel. Relatively few Medical Department

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From the Civil Public Health Division, Surgeon General's Office.

officers can be spared for these duties. For the most efficient use of the available personnel, these officers can be assigned only to key administrative positions where they may direct local health and medical personnel and assist in obtaining medical supplies essential to the program. Local resources in personnel and supplies are used to the fullest extent possible.

The selection of personnel is made with these limitations in mind. Medical Department civil affairs officers are carefully selected with a background of public health experience, and administrative ability. Knowledge of the language and culture of the area is highly desirable. For civil affairs operations in the Philippines, the Army was fortunate in having the services of a number of Filipino officers. Officers trained as supply officers, epidemiologists, sanitary engineers, nutritionists, veterinarians, and public health nurses are particularly useful in this work.

The majority of civil affairs officers are trained for about six weeks at the School of Military Government, Charlottesville, Virginia, and then go for about six months of concentrated study to one of several universities where they study military government and the government, culture, and language of the area to which they will be assigned; in addition, Medical Department officers study public health problems peculiar to that area. While waiting to move into the assigned areas, this training is continued both in the zone of the interior and in communications zones.



American wounded received treatment in the square at Troyes, during Allied invasion of France. 26 August 1944. Signal Corps photograph.



### THE CLINICAL PSYCHOLOGICAL PROGRAM

In response to an urgent need for additional help in the advancement of therapeutic work with neuropsychiatric patients, The Clinical Psychological Program was initiated. The duties of clinical psychologists are to include the following:

1. They will aid in developing and administering the program of counseling designed to prepare convalescent patients for return to military duty.
2. They will assist in the preparation of clinical records, particularly those requiring the use and interpretation of special psychological tests as desired by the chief of the neuropsychiatric section.
3. They will assist in studies of special psychological problems related to the classification and retraining of neuropsychiatric casualties.
4. They will assist in determining the appropriate military occupational specialty of men who are designated as ready for assignment to a specific duty or to special training.
5. They will perform such other professional duties in the hospital as will best assist the neuropsychiatrist in the management and disposition of patients.

The Office of the Chief Clinical Psychologist, Adjutant General's Office, is charged with defining the qualifications of all clinical psychologists assigned to neuropsychiatric sections of installations of the Medical Department of the Army. Training doctrine and procedures will be established and maintained so that the province of the clinical psychologist will be clear. Additional training, specific and to the point, will be given to aid the psychologist. It is expected that training of personnel will continue after the initial assignments have been made. The Office of the Chief Clinical Psychologist will select and advise in the standardization of all clinical psychological tests to be used in the psychological examination of military personnel in medical installations or for whom medical disposition is required.

A program for the training of clinical psychologists has been prepared by the Office of the Chief Clinical Psychologist. It is intended to prepare selected officers for the assumption of their duties on assignment to the neuropsychiatric sections of hospitals. The program is practical. Emphasis has been placed on the use of clinical techniques and procedures.

The training program will point toward having the psychologist view the patient as a whole individual and not as a psychosis or neurosis. The psychologist will understand that his work is but one part of the retraining of an individual, and that other persons and agencies, such as the occupational therapist, the Red Cross worker, the chaplain, and the neuropsychiatrist, all have contributions to make in the readjustment of a total personality.

The program is still new. At present, ninety-six enlisted men have been commissioned as second lieutenants with duty as clinical psychologists. More than one-half of the newly com-

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From Classification and Replacement Branch, Office of Chief Clinical Psychologist, Adjutant General's Office.



missioned officers have completed the prescribed course of study and have been assigned to duty. The remainder are at school or are taking training in Army medical installations. In addition, eighty-one officers whose background and experience qualified them as clinical psychologists have been assigned to the Clinical Psychological Program.



Americans wounded in France being hoisted aboard a hospital ship in England, August 1944.

### WAR WOUND MOULAGES

Lifelike masks and models of war wounds are being produced by the Medical Department at the rate of some two hundred sets a week for use in training programs of the Air, Ground, and Service Forces. These "war wound moulages" have recently been standardized and are to be made available to authorized units through regular supply channels.

Each set consists of eight models which can be tied in position on a subject to simulate actual wounds. Two masks for the head and face show a shell fragment wound of the forehead and a gunshot wound of the jaw, respectively. Other models demonstrate the appearance of a shell fragment wound in the arm, fracture of the humerus, and gunshot wound; traumatic amputation of fingers; a burn of the trunk; sucking wound of the chest and a gunshot wound of the abdomen; gunshot wound of the thigh; and a traumatic amputation below the knee. The use of these training aids for each type of wound simulated is described in detail in War Department Technical Bulletin TB MED 116, 18 November 1944, and Change 1, 11 December 1944. One of these technical bulletins is to accompany each set and one is to be distributed to each Medical Department officer.

Devised originally as a training aid for Medical Department personnel only, moulages had a limited distribution when first issued in 1943. Because of the realism they injected into the training programs of medical units, requests were received that they be made available for teaching first aid to other branches of the service. A limited supply of rubber and production facilities made impossible the task of supplying even medical units until the recent development by The Surgeon General's Office of a plan to use a synthetic substitute for rubber and large-scale commercial production methods.

Distribution for replacement training centers is on the basis of one set per two thousand enlisted men in the Army Air Forces, one set per one thousand enlisted men in the Army Ground Forces and Army Service Forces other than medical, and four sets per one thousand enlisted men in Army Service Forces medical training centers. In addition, one set is to go to each medical enlisted technicians school, parachute school, antiaircraft school, armored school, coast artillery school, cavalry school, field artillery school, infantry school, tank destroyer school, A.S.T.P. basic training center, station hospital (ZI), station hospital (CZ), general hospital (ZI), general hospital (CZ), field hospital, evacuation hospital, portable surgical hospital, regional station hospital, and headquarters of separate regiment or separate group. Six sets are authorized for each division, ten sets for the Medical Field Service School at Carlisle Barracks, and ten sets to each air force and command (CZ).

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From the Training Division, Operations Service, Surgeon General's Office.

### THE SANITARY CORPS

During World War I, the Sanitary Corps reached a total strength of 2,895 officers, after which the Corps was dissolved, as it had been authorized only for that emergency. In the reorganization of the Army in 1920, the Sanitary Reserve Corps was created and, at the same time, the Medical Administrative Corps, to which the administrative officers of the Sanitary Corps were transferred. It was realized in 1941 that more Sanitary Corps officers would be needed by the Medical Department and new qualifications for appointment, requiring a college degree and at least two years of satisfactory experience in their profession, were established. As of 29 November 1944 the Sanitary Corps included: sanitary engineers, 919; entomologists, 230; bacteriologists, 485; general laboratory officers, 245; biochemists, 280; parasitologists, 103; serologists, 32; nutrition officers, 153; industrial hygienists, 61, making a total of 2,508. At that time, 170 additional Sanitary Corps officers were in process of conversion into the Medical Administrative Corps.

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### PHYSICAL FITNESS DENTAL HEALTH PROGRAM\*

Never before has so much attention been focused on the importance of 17- and 18-year olds to the future security of the nation. The dental profession has taken steps toward instituting an "action" program designed to raise the health status of high school students approaching military age. This was done to make high school graduates dentally fit to fulfill their duties in the armed and industrial forces of the nation.

The principles on which this program was built included the coordination of the efforts of the teaching, public health, and dental professions and other groups interested in school health. In October 1942 the Council on Dental Health of the American Dental Association submitted the idea to the U. S. Office of Education and the Public Health Service. The plan was accepted and the program was designed and was launched under the cosponsorship of the U. S. Office of Education, U. S. Public Health Service, and the American Dental Association, 15 March 1943. Forty state dental societies have appointed committees to stimulate the program on state and local levels.

This program will be repeated this (1944-1945) school year. Its wartime objective is to make high school seniors dentally fit to fulfill their responsibilities in the war effort. Its long-range objective is to establish a friendly and effective working relationship among educators and public health, dental, and other groups. Although wartime conditions have created many obstacles, a high percentage of corrections for older pupils have been reported by high schools in various localities. The American Dental Association has requested dental

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\*Abstract of an article prepared by Leon R. Kramer, D. D. S., of the Council on Dental Health, American Dental Association.

health directors to promote this program on state and local levels and to coordinate the activities of state and local education, public health, dental, and other groups interested in school health. The Office of Education has requested state superintendents of public instruction and school officials to cooperate with the dental society and health agency in each state in the execution of the program. Local practicing dentists and clinics may do their part by adjusting appointments so that pupils requesting dental care may have needed work completed before the end of the current school year.

To dentists now in our armed forces, this program should be of interest. It does much to reduce the initial dental service requirements of those being inducted into service. It will be adaptable to universal service plans.

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#### COMMITTEE FOR INSECT AND RODENT CONTROL

The first meeting of the Army Committee for Insect and Rodent Control, the formation of which was directed in War Department Memorandum No. 40-44, dated 8 November 1944, was held on 27 November 1944 in The Surgeon General's Office. The meeting was devoted chiefly to considering further organization of the committee to determine how best to carry out its responsibilities. This discussion was preceded by a review of developments in research on insecticides and repellents over the past three years, of airplane dissemination of DDT, of Chemical Warfare Service insecticide and repellent projects, and recommendations resulting from the recent review of the rodent control items employed by the Army.

The committee appointed members to each of four subcommittees—research and development; field uses; production, allocation, and distribution; and training. Representatives were present from various War Department offices in addition to those from various divisions of the Preventive Medicine Service of The Surgeon General's Office and from the United States of America Typhus Commission. The committee voted to request that a liaison representative from the Navy, Department of Agriculture, Public Health Service, and Pure Food and Drug Administration attend the meetings for the mutual interchange of information. The chairman of the committee is Major General Norman T. Kirk, The Surgeon General; the executive chairman is Lieut. Colonel Arnold L. Ahnfeldt, director of the Sanitation and Hygiene Division.

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**Rodents in the Philippines.**—A key to the Philippine families of Rodentia appears in the following publication: "Philippine Land Mammals," by E. H. Taylor. Monograph No. 30, Department of Agriculture and Commerce, Bureau of Science. Manila: Bureau of Printing, 1934. On request, a photoduplication of this key will be furnished by the Director, Army Medical Library, 7th Street and Independence Avenue, SW., Washington 25, D. C.



### JUNGLE FRUITS AND VEGETABLES

Young bamboo shoots are regarded by the natives of Burma as the best of vegetables, and they look forward to the rainy season when they can be obtained. Both wild and cultivated bamboo, in fact all kinds of shoots, are used for curry. The Mai Hok bamboo, which grows in ravines and along streams, is the easiest to find and prepare. In very high places, the Mai Hei bamboo, with the very long joints and about 2 inches in diameter, is the best. These shoots will be found throughout the year. It is best to gather the smallest shoots but, if late in the season, the old ones several feet high will be still good near the tips. Of the cultivated bamboos, the Mai Wan is the only kind that does not need soaking before use. Sometimes the fuzz on the sheathlike covering gets on the hands and if it is spread to the tender parts of the skin will cause severe itching. The native method to remove the fuzz is to rub the hands through the hair against the scalp. It is better to use jungle bamboo than those kinds growing around villages. With the exception of Mai Wan the cultivated bamboo requires much more preparation than any of the wild varieties.

The young shoots are cut off with a knife or broken off and the outer sheaths peeled off. The tender inside looks like a huge asparagus shoot. They are then washed to remove all the fuzz and cut into thin pieces. If the shoots are to be used at once, they are boiled for a few minutes, and the water poured off; then they are boiled again or mixed with the curry or stew. If the shoots are not required at once, the pieces are soaked overnight in water and boiled with meat without removing the water. This is the best method, as it retains the flavor. Boiled bamboo shoots may also be fried. The large cultivated bamboo found around the villages must be soaked before boiling and after it has been boiled for a few minutes the water has to be changed.

From February to the end of April, the hills in many parts of Burma will be dotted with *Bauhinia* trees in full bloom. The flower is shaped like that of the iris and is white with a deep crimson line running down one petal. It has a pleasing odor. The leaves look like two kidneys stuck together. The flowers with the unique red marking make the tree outstanding. It has a beanlike pod 6 inches long. The flower, not the leaves or pod, is used as a vegetable. The fresh flowers are gathered. The petals are separated, washed, and then put on to boil for a few minutes and the water thrown away. They are good fried or cooked with meat. If the petals are boiled for ten minutes before the water is changed, the sweet taste can be removed. There are no ill effects from the use of this flower if prepared in this way.

Of the many kinds of banyans, the best is the variety growing near villages. The young leaves that come out from January to March are pink, the leaf is broad, the bark very

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Extract from special report, Office of War Information.

smooth, and the tree is not as spreading as the other banyans. A white, milky, and very sticky sap exudes when the bark is cut. Most banyan leaves are puckery to the taste, but this variety is tart. The fruit is pale green (pink on top when ripe) and about the size of a pea. Other kinds of banyans are used but the taste is not so good.

The young leaves which are used for curry are picked and the transparent sheaths over the leaf buds removed. They are washed and cooked with meat or fried after being boiled. The tart taste is retained, but if the leaves are boiled and the water changed, much of the tartness is removed.

The wild variety of brinjal is found in low jungles especially around old village sites. The plants are thorny. The leaves and flowers are much like the cultivated brinjal or eggplant. The fruit grows in bunches on the end of the branches. It is green and about the size of a large gooseberry. The fruit when broken smells like a raw potato, and the seeds are small and disklike. There is a distinct smell to the leaves. Only the unripened fruit is used for food; it is either cooked in curries or fried. No special preparation is necessary. It is regarded as a tonic by the natives.

Rattan, a vinelike plant covered with needle-shaped thorns, grows in dense jungles. It climbs to the topmost branches of tall trees. The leaves are about 2 feet long and similar to those of the jungle palm. The best kind of rattan is distinguished by a thorny feeler that hangs down 10 to 15 feet. It is slightly bitter but very nutritious. The top end of the vine is cut off 3 feet from the tip and the leaves and thorny sheaths peeled off. Only the inside of the shoot, not the long spiral-like young leaves that are tightly twisted together, are used. This is placed in the red coals and allowed to char on the outside. When the shoot is placed first on the coals, steam penetrating the core softens it.

The water *Diplazium* is the best green obtainable in the jungles and is used alone or with any kind of meat and vegetable. It is not found in the highest altitudes but is common in the low jungles. The young leaves and thick pigtail-like fuzzy shoot is used. It has a base trunk like a small tree fern but never grows more than 8 feet high. The young leaves are smooth, shiny, and usually curled. There are no ferns in the jungle like them. They can be found in new leaf at almost any time. The taste is pleasing and it is one of the most nutritious of jungle vegetables. The young leaves and shoots are picked and boiled either alone or with any kind of curry or vegetable mixture. The soft hairs of the shoots are soon cooked into a wet pulp while the greens remain intact.

#### Wild Figs

There are many kinds of wild fig trees. Mai Leu King fig, which is in young leaf during March and April, is prized by the people of the plains. The deep red fruit hangs down



in great clusters. The bark is smooth and light in color. The leaves are small and smooth. This wild fig tree is often 60 feet high. The fruit of this tree is not eaten.

As the Mai Leu King fig is to the plains people, the Hpak Wa fig is to the hill folk. The tree has large leaves and the fruit is the size of large apples. The fruit is attached to the trunk. The trees never grow tall, and the branches are low and spreading. The young leaves are dark red. The adult leaves are rough like fine sandpaper. The leaves are nearly round and are easily noticed. The young leaves of both these trees are picked and cooked as ordinary vegetables. It is not necessary to boil them before preparing a stew or curry. Both varieties are very good with meat or fish.

The jack fruit is really a cultivated tree but may be found in many old village sites and along paths and roads. The fruit grows along the upright trunk and not on the branches; it has a rough, checkered skin and is known as the tripe fruit by the hill people, because the outer coat is like the inside of a cow's stomach. The trees in the low areas are usually cut halfway through as the core is used as a dye. The young, half-developed fruit is used as a vegetable. The young fruit is gathered and the skin peeled off. It is very good if first boiled and then fried. In the matured fruits, the large mealy seeds can be roasted in the coals. The seeds in themselves will make a good meal.

There are two varieties of the wild plantain tree which are of great value as a vegetable. One is the red plantain and the other the gray plantain; they are equally good. The flower bud of the wild plantain is widely used cooked with any kind of meat or used separately. When the flower is not obtainable, the tree may be cut down and the inner white core used as a vegetable. When cut or broken, the core is full of long, white fibers which appear to be too stringy for use, but they all cook up well. The core is rather tasteless but can be flavored to make a pleasing dish.

The tough outer sheaths of the flower bud of the plantain are removed until the tender part is exposed. It is then cut up and prepared as a vegetable. The core is also cut up in small pieces and cooked, but lacking taste, some flavoring should be added. The bud can be prepared in many ways. It is used by the natives to feed sick persons.

The water parsnip grows in wet ravines. There is a cress-like smell to the leaves and they have stalks about 10 inches long. It is sometimes called water celery. Actually it does not belong to the parsnip or celery family as it has runners like a strawberry plant. The leaves are inclined to be rough. Both old and young plants may be used. This is an important green in the jungle menu. It grows a foot high and when looking for it, one must remember how a clump of celery

looks; however, instead of being so thick, this plant is thin at the base with perhaps only half a dozen leaf stalks. There is little danger of mistaking it for some other water plant. The leaves and stalks can be eaten either raw or cooked. The smell is rather strong and some like to boil the leaves for a few minutes and change the water.

The paper tree grows in the lower areas and is often found in old village sites. It has a smooth bark dotted with small red spots. The leaves are rough and have a sandy touch when fully matured. They look like the mulberry leaf but are a bit larger. There are two kinds of fruit on this tree. The sterile variety has tassel-like fruit 2 inches long and the fertile kind has a round, green, fluffy berry, the size of a large marble. When the fruit is ripe, the seeds project beyond the skin and are covered with a red juicy film. The young leaves are good as a vegetable and are sold in the leading bazaars of the plains. The young leaves are gathered. They are a bit fuzzy when raw but a few minutes' boiling softens the fuzz.

The jungle pith tree is plentiful in most areas. It looks like a papaya tree. The average height is 20 feet. The young shoots at the top are used as greens. The young leaves are first boiled and the water thrown off. They are then washed thoroughly in new water and again put on to boil. This removes the bitter taste and a unique flavor is obtained by frying or steaming the cooked leaves.

#### Pumpkins

The wild perennial pumpkin cannot be mistaken for any other kind of fruit. It grows on large vines that creep on the ground or climb low trees. The fruit looks like a large muskmelon with deeply marked sections. The leaves are shaped like a large morning-glory leaf and are thick and stiff. By opening the hard shell and removing the large seeds, one can be certain he has the right fruit. The seeds of this fruit are rich in oil and one seed is sufficient to cook or fry a whole pot of stew or curry. This vine is of great use to people who cannot get fats or oils for cooking.

The shell of the seed is hard and the inner lining is bitter. The seeds are cracked open by pounding with a stone and the mealy inside removed, care being taken to peel off all the bitter film. The seed pulp is then put in a pot and the oil rendered by placing it on the fire. If the filmy covering is all removed, the oil is not affected and makes a very nutritious and nourishing base for frying meats and vegetables. The pulp of the seed if squeezed together can be lighted like a candle.

Roselle is a cultivated plant but it reseeds itself and is widely distributed. It is an annual about 6 feet high and the branches look like hemp. There are two kinds—one with

green leaves and the other with red vines and stalks. It has a yellow flower 2 inches across with a dark sepia-colored spot in the center. The fruit looks like a flower bud with a ring of thornlike petals around the base and covered with a stiff, hairy fuzz. If the outside petals of the fruit are removed, a semiround, green seedpod will be seen. The young leaves of this plant are good for greens, and the red petals of the one variety makes a fine substitute for cranberry sauce when cooked into a pulp. The petals of the fruits are sour and, unless sugar or cane jaggery is available, they will be too tart for use.

The tamarind tree is common all over India and Burma. The leaves are 4 to 6 inches long, the bark rough; the fruit looks like bean pods. The fruit is best taken after meals and it is very laxative. There is no special method used for cooking tamarind leaves. They are freely used as greens when in season and are nutritious. The flowers may also be used and cooked along with the leaves.

The jungles contain a great variety of wild yams which are used as a substitute for rice during famine or just before the new rice is harvested. Some of the yams are as much as 6 feet long. Yams can be obtained almost any time of the year but are not so good just after the new vines have started. Most of the leaves look like those of the morning-glory but do not wilt so easily. Only a few kinds are not used. In the dry season after the jungles dry out, the vines are still easily traced. Some varieties are easy to dig with any kind of sharpened stick. Yams can be prepared in the same way as potatoes. They are commonly peeled, boiled, and mashed by the natives. In the jungle when a cooking pot is not available, the usual method is to roast them.



Cpl. Harley Peterson, 251st Quartermaster Remount Squadron, in corral driving horses to the chutes preparatory to shipment. Signal Corps photograph.

### CONFERENCE OF SERVICE COMMAND SURGEONS

A conference of service command surgeons was held at The Surgeon General's Office on 11 to 14 December 1944, at which were discussed the following topics: personnel, redeployment, hospitalization, convalescence and reconditioning, professional care, preventive medicine, major trends, and public relations. The conference was opened by a brief talk by Major General Norman T. Kirk, The Surgeon General. The purpose of this annual meeting was to stimulate a full interchange of ideas on techniques, practices, and policies and to discuss significant problems. After each talk a round-table discussion was held in which the surgeons reported developments of a scientific nature as well as problems affecting their sections of the country.

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### NEW PAMPHLETS FOR SOLDIERS

"So You've Got a Furlough," is the name of a new pamphlet prepared by the Preventive Medicine Service, Surgeon General's Office, in conjunction with the Information and Education Division, Army Service Forces. The twenty-page, attractive pocket-sized pamphlet contains information of value to military personnel on furlough, a section on health including venereal disease control, information on malaria, and advice on what the soldier should do if he gets sick while on furlough. The pamphlet is being distributed through The Adjutant General depots. An initial informational distribution was made to all military installations as prescribed in paragraph 9a, FM 21-6, following which supplies are to be requisitioned in accordance with AR 310-200. A War Department circular is in preparation which provides that all officers authorized to grant furloughs will furnish a pamphlet to each man leaving on furlough. The distribution, which is restricted to the continental United States, is to continue until each man has received a copy of the pamphlet.

The pamphlet, "Even Snafu Knows," has been produced by the Venereal Disease Control Division, Preventive Medicine Service, Surgeon General's Office, for distribution in the China and Burma-India Theaters. This pamphlet was prepared in response to a theater request under the authority of War Department Circular No. 28, 1944, which designated the Office of The Surgeon General as the War Department agency concerned with the production and distribution of venereal disease educational materials.

The request from the theater surgeon was accompanied by rough sketches and the copy desired, with which The Surgeon General's Office arranged for art work and design, printing, and shipment to the theater. Similar venereal disease educational material designed to meet specific local problems can be produced by The Surgeon General's Office on the request of any overseas theater.

This particular pamphlet takes its title from the cartoon character of the *Army Screen Magazine*, "Private Snafu," a familiar face to troops overseas. In addition to information about the venereal disease problems of the theater, there are in the pamphlet maps of five principal theater cities showing the location of prophylactic stations and the areas in the cities which are off-limits to troops.

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#### THE PHILIPPINE ISLANDS

The Philippine archipelago, which lies about 500 miles off the east coast of China, comprises 7,083 islands, of which 11 are larger than the state of Rhode Island; however, in the archipelago only 462 islands have areas greater than one square mile. The smaller islands are usually low coral formations, although some are volcanic. Rivers and even artesian wells commonly are polluted. The dysenteries and typhoid fever are highly endemic. Malaria is second in importance to the diarrheal diseases. Fungus diseases of the feet, hands, and flexures must be anticipated. The last cholera epidemic was reported in 1931-1934. No cases of plague have been recorded since 1914; however, the Philippines are rat infested and shipping traffic between the Philippines and the plague-infested Java and Indo-China is heavy. Filariasis (*bancrofti*) is endemic. Dengue, yaws, trachoma, and venereal diseases are common. Leprosy is especially prevalent in Cebu and Ilocos Sur. Schistosomiasis exists in Leyte, Samar, Mindanao, and Mindoro, in which islands the water of rice fields, streams, lakes, and irrigation ditches may be infested with parasites.



These Army nurses, in full battle dress, will be the first to leave the ship. They seem to enjoy the prospect of having *terra firma* beneath their feet. England, 11 January 1944. Signal Corps photograph.

### MEDICAL DEPARTMENT UNITS CITED

The War Department has announced the award of the Distinguished Unit Citation to the COLLECTING PLATOON, COMPANY B, 262d MEDICAL BATTALION. Following the landing in the vicinity of Humboldt Bay, Dutch New Guinea, circumstances forced the establishment of large supply dumps. The collecting platoon had set up an aid station in the center of the dump area. On 23 April 1944, an enemy bomber made a direct hit on one of the ammunition dumps, causing explosions and fires throughout the night and the next day. Two officers and forty-four men of the platoon maintained their aid station, moving continuously through the holocaust to rescue comrades and apply first aid. Thus many lives were saved. The platoon retired to a position of security only after all casualties and personnel had been evacuated from the danger area.

The War Department has announced the award of the Distinguished Unit Citation to the 307th AIRBORNE MEDICAL COMPANY, 82d AIRBORNE DIVISION, for extraordinary heroism and outstanding performance of duty in the initial assault on the northern coast of Normandy, on 6 June 1944. This unit landed by glider on the Cotentin Peninsula in the area surrounding Ste. Mère Église, France, in the face of artillery, machine-gun, and antiaircraft fire. Almost without rest or pause for forty-eight hours, officers and enlisted men of the company gave the utmost of skill and will to accomplish their work of mercy in caring for the wounded. Duties were performed unhesitatingly with superior efficiency and tireless devotion.

Announcement is made of the award of the Meritorious Service Unit Plaque, by the Commanding General, Seventh Service Command, on 6 November 1944, to the 1705th Service Command Unit, Central Dental Laboratory, Jefferson Barracks, Missouri, for its superior performance and outstanding devotion to duty in the performance of exceptionally difficult tasks. This unit achieved and maintained a high degree of military and professional efficiency throughout a period of over twelve months as evidenced by superior individual conduct of its personnel, high *esprit de corps*, and a superior over-all administrative record combined with outstanding discipline and morale.

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### THE WALTER REED MEDAL

At the annual meeting of the American Society of Tropical Medicine, St. Louis, 15 November 1944, the Walter Reed Medal was awarded to Brigadier General James Stevens Simmons, U. S. Army, chief of the Preventive Medicine Service, Surgeon General's Office, Washington, D. C., in recognition of meritorious achievement in tropical medicine and for outstanding work in safeguarding the health of American troops. General Simmons was chosen also president-elect of this society at this meeting.



The American Society of Tropical Medicine, which established the Walter Reed Medal in 1934, has awarded the medal on only four previous occasions. A medal was awarded in 1936, posthumously, to Major Walter Reed for his experimental work on yellow fever, and another medal to the Rockefeller Foundation for its study and control of yellow fever. The medal was awarded in 1939 to Dr. William B. Castle, of Harvard University, for his work on tropical anemia and sprue; in 1940 to Dr. Herbert H. Clark, director of the Gorgas Memorial Laboratory in the Panama Canal Zone, for his work on malaria; in 1942 a medal was awarded posthumously to Dr. Carlos J. Finlay, of Havana, Cuba, for his work on yellow fever, and another medal to the United States of Brazil for outstanding work in the eradication of *Anopheles gambiae* in Brazil.

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#### AWARD OF LEGION OF MERIT

The War Department has announced the award of the Legion of Merit to the following Medical Department personnel:

COLONEL WILLIAM H. DEAN, V.C., General Staff Corps, Headquarters, Services of Supply, North African Theater of Operations, United States Army: For exceptionally meritorious conduct in the performance of outstanding services during the period 15 December 1943 to 26 May 1944. As head of the Operations Section and later as Assistant Chief of Staff, G-4, Headquarters, Services of Supply, North African Theater of Operations, United States Army, he molded a highly effective administrative supply organization from a limited staff. Under his determined and skillful direction, supplies were invariably available when needed by the combat forces both during the successful amphibious operations at Anzio and later as Fifth Army moved forward in Italy. By his seasoned judgment, keen insight, superior administrative capacity, and resolute devotion to duty, Colonel Dean has rendered significant service to his country so as to reflect credit on himself and the Army of the United States. He entered service from Pennsylvania.

MAJOR RICHARD T. GILYARD, V.C.: For exceptionally meritorious conduct in the performance of outstanding services in inaugurating a vigorous campaign to eradicate equine encephalomyelitis on the island of Trinidad, B.W.I., during the period 1 October 1943 to 20 January 1944. This campaign was expertly organized and guided by Major Gilyard, and because of its vigorous handling, civilian and military loss of life was reduced to a minimum. Major Gilyard, in this campaign, also saved many thousands of dollars for the civilian inhabitants of Trinidad, who own horses, mules, and donkeys. In his zeal and compelling sense of duty, Major Gilyard was tireless. In his efforts, in the field, collecting mosquitoes from animals sick and dying of encephalomyelitis, he displayed a self-sacrificing attitude, knowing well that were he to contract the disease it would most certainly cause his death or permanent disability. He entered the service on 9 March 1942 from Connecticut.

MAJOR ROBERT B. MEEKS, V.C., A.U.S.: For exceptionally meritorious conduct in the performance of outstanding services as veterinary officer of an infantry division from 11 May 1942 to 1 August 1943. Major Meeks assisted the Icelandic Government in the control of disease prevalent among the domestic animals of Iceland, and by his courteous, efficient help to the farmers promoted a more amicable relationship between the Icelandic and American peoples.

**AWARD OF THE BRONZE STAR MEDAL**

The War Department has announced the award of the Bronze Star Medal to the following Medical Department personnel:

TECHNICIAN THIRD GRADE WILLIAM E. CLEMENTS, of Slater, Missouri; TECHNICIAN FOURTH GRADE THOMAS C. HENNINGS, of Oakland, California; and PRIVATE JOHN H. NICHOLS, of Tulsa, Oklahoma: Near Saidor, New Guinea, on 28 January 1944, when informed that their battalion commander was seriously wounded, these three aid men volunteered to join an officer and another enlisted man in removing him to safety. It was necessary to crawl under enemy machine-gun, rifle, and grenade fire in order to reach the wounded officer. They administered first aid, improvised a litter, and, still under heavy enemy fire, dragged their battalion commander to safety.

TECHNICIAN FOURTH GRADE JAMES W. PATRICK, of Quitaque, Texas: As assistant to the sanitary officer during and following the assault on Kwajalein Island from 20 January to 16 March 1944, his courageous action in the face of enemy resistance, his high sense of duty, and his ability to instruct and supervise burial details contributed materially to the success of the mission and to the health and morale of the garrison troops.

CORPORAL CHARLES F. PRUDEN, of Granby, Missouri: On 23 June 1944 at New Guinea he assisted under heavy fire in the evacuation of the wounded from a point on an enemy-held shore.

TECHNICIAN FIFTH GRADE HENRY L. BONNER, of Centralia, Illinois, TECHNICIAN FIFTH GRADE CHARLES G. GUNDRUM, of Chicago, Illinois, and PRIVATE GEORGE H. GASTON, of Lost Creek, West Virginia: From 12 to 15 March 1944 at Bougainville, Solomon Islands, each man was a litter bearer during heavy action on Hill 260 and while he was under intense enemy fire, with unselfish devotion to duty, went forward through exposed terrain and direct fire to aid and evacuate a wounded soldier, lying within 30 yards of an enemy position. While preparing the wounded for return they were subjected to enemy mortar fire that wounded each of them. Their gallant and courageous efforts and their willingness to sacrifice themselves exemplified the highest traditions of the military service.

TECHNICIAN FIFTH GRADE RICHARD C. NOEL, of Milan, Missouri: On 22 June 1944 at New Guinea he volunteered to help evacuate the wounded under intense fire from an enemy-held shore line.

PRIVATE FIRST CLASS MELVIN A. MOORHOUS, of Culbertson, Nebraska: At Bougainville, Solomon Islands, on 4 April 1944, when two infantrymen were wounded he, disregarding his own safety and the added hazard of movement at night, left the comparative safety of his own shelter to give them first aid and summon medical assistance.

PRIVATE FIRST CLASS THEODORE TAYLOR, of Benton, Arkansas: As a driver of an ambulance he made repeated trips to evacuate the wounded under enemy fire at New Guinea from 12 to 24 June 1944.

PRIVATE WILLIAM LISECKI, posthumous: For gallantry in action 9 September 1943. (Reported killed in action in Italy on 23 December 1943)

CAPTAIN RAY F. CHESLEY, SN. C., then master sergeant, of Hop Bottom, Pa.: For meritorious service during May 1942. Captain Chesley, with other U. S. military personnel and civilians, assisted in the destruction of military installations and equipment of benefit to the enemy, and withdrew with General Stilwell from Burma to India. The trek was made on foot across mountainous, jungle terrain, and swollen streams. Captain Chesley's endurance, cheerfulness, and concern for the welfare of other members of the party contributed much to the successful completion of this march.

### RECENT DIRECTIVES AND PUBLICATIONS

This list is intended as only a brief reference to the items mentioned. Before acting on any of them, the original communication should be read, and requests for copies, when made, should be directed to the source of the communication through proper channels.

WD Circular No. 397  
9 Oct. 44  
Sect. VII

Tax. Interprets Soldiers and Sailors Civil Relief Act so far as it relieves military personnel from poll, income, intangible and tangible property, and motor vehicle taxes, where they are in the taxing jurisdiction pursuant to military orders.

ASF, Headquarters  
Circular No. 354  
27 Oct. 44  
Part II, Sect. III

W.D. Records. Chiefs of technical services and others to take immediate action to designate and train records administrators at headquarters, and all installations under their command. Sets forth functions of records administrators.

ASF, Headquarters  
Circular No. 365  
6 Nov. 44  
Part II, Sect. V

Patients. Following patients to be transferred to Valley Forge and Dibble General Hospitals: (1) those blind in both eyes; (2) those blind in one eye with marked impairment of vision in other eye. Also specifies certain patients to be transferred to general hospitals designated for plastic and ophthalmic surgery, and specifies certain patients with eye defects who are to be transferred to named general hospitals.

WD Memo. 40-44  
8 Nov. 44

Committee for Insect and Rodent Control. Establishes Army Committee for Insect and Rodent Control to function under supervision of the Commanding General, A.S.F., and under chairmanship of The Surgeon General. Committee to coordinate research and development problems and problems of production, supply, and distribution of materials and equipment for insect and rodent control. Lists W.D. agencies to be represented on committee and prescribes functions and responsibilities of committee. The Surgeon General to maintain liaison for Army with other agencies such as the Office of Scientific Research and Development, Navy, Public Health Service, and Dept. of Agriculture.

ASF, Headquarters  
Circular No. 371  
10 Nov. 44  
Part II, Sect. I

Convalescent Hospitals. Purpose for which convalescent hospitals were established necessitates program not appropriate for female convalescent patients. Hospitals having female patients will continue reconditioning program as now established for such patients until ready for final disposition. No female patients from the zone of the interior or arriving from overseas will be transferred to convalescent hospitals.

ASF, Headquarters  
Circular No. 374  
13 Nov. 44  
Part II, Sect. IX

Patients. Patients requiring additional medical and domiciliary care after maximum hospitalization has been attained should be discharged to care of the Veterans' Administration under AR 615-361. Exceptions to the foregoing policy are patients with peripheral nerve injuries. Such patients will be handled under Sect. II, W.D. Cir. No. 423, 27 October 1944. Foregoing provisions are not to change method of disposing of tuberculous or psychotic patients.

(Additional references appear on page 118.)

From the Legal Division, Surgeon General's Office.



Litter bearers bring back the wounded during attempt to span the Rapido River near Cassino, Italy. Signal Corps photograph.



An American soldier being given blood plasma at first-aid station one-half mile behind the front lines in Sicily. Signal Corps photograph.



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## Plan for Setting Up a 750-Bed Evacuation Hospital

COLONEL W. F. MACFEE

Medical Corps, Army of the United States

The essential function of an evacuation hospital is to give to the greatest possible number of casualties, in the shortest possible time, the treatment necessary to ensure early recovery and make evacuation safe and comfortable. The number of patients taken care of in a day should be limited only by the time required for the actual surgical procedures. To this end, the movement of patients from the reception tents to the operating tents should be an orderly progression during which all necessary preoperative measures are carried out before the patient reaches the operating table. The efficient and continuous performance of the evacuation hospital depends in large measure on the arrangement of the physical equipment, particularly the tents, and on conservation of the working capacity of the hospital personnel.

With these considerations in mind, a plan for setting up a 750-bed evacuation hospital is presented. The plan represents a further development of the basic cruciate arrangement of tents practiced by various field units, notably the field hospital platoons. The cruciate joining of four tents is best accomplished by placing a pyramidal tent at the junction and overlapping its walls with the flaps of the adjacent ward tents. The end-to-end joining of two tents is done by overlapping the flaps. The side-to-side arrangement is achieved by rolling the adjacent side walls together and supporting the rolled line of junction at a level higher than the tops of the component tents. This is accomplished by means of a ridgepole placed transverse to the roll and held up by tent poles.

The main receiving tent consists of three ward tents joined side to side; the main tent is flanked on either side by laterally joined double tents, which are used as auxiliary receiving tents in the event of a large influx of patients.

The distal end of the central unit of the main receiving tent is connected to a ward tent which serves as the triage or sorting tent. Patients requiring shock treatment are sent by the triage officer to the shock tent, which joins the triage tent at right angles. The laboratory, joined to the other end of the shock tent, contains a store of blood and plasma and has equipment necessary for determining the blood changes occurring





technician assigned to the table immediately sets about cleaning and shaving the area of the wound. Only the final steps of preparation and draping are done by the surgeon. After the operation is finished, the patient, if suitable for early evacuation, is taken to one of the evacuation wards. If nontransportable, he is placed in one of the four single-tent wards (wards 1, 2, 3, and 4) arranged about the operating tents where he can be kept under close observation.

At the rear of the operating tents and joined to them is the double central supply tent which from one end serves the operating tents and from the other, the wards. The pharmacy is opposite the end of the central supply tent so that drugs and sterile supplies can be obtained by the wards at a single trip.

#### SUMMARY

Some advantages of the arrangement described are:

1. Blackout precautions are greatly facilitated by the fact that once a patient has entered the receiving tent he remains under cover until he leaves the operating tent.
2. The same advantage holds with respect to bad weather.
3. The work of the litter bearers is eased, particularly at night, because there is no carrying of patients in the dark except from operating tent to ward tent.
4. The progression of the patient from the receiving tent, through surgery, and to the postoperative ward is always one-way.
5. The system is flexible. For example, if a patient recovering from shock needs to go immediately to the operating tent, all the intermediate steps may be omitted without inconvenience.
6. A large number of wounded awaiting operation can be handled easily and without confusion.
7. Patients prepared for surgery can be delivered to the operating tents as fast as they can be operated on. All unnecessary loss of the surgeon's time is eliminated.
8. The joining together of tents enables a limited personnel to take care of a greater number of patients.

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"This Is the Army."—General George C. Marshall, Chief of Staff, accepted on 22 November 1944, from the president of Warner Brothers Pictures, Inc., the seven-millionth dollar bill raised through showing of the film, "This is the Army." The \$7,000,000 has been given to Army Emergency Relief. Mr. Irving Berlin, composer of the musical show, was present at the ceremony in General Marshall's office. Mr. Harry M. Warner said that, in this country alone, more than 50,000,000 people have paid nearly 65,000,000 admissions to see the picture. This sum could not have been raised without the cooperation of the motion picture theater owners. The Warner company produced the picture at cost and turned over to Army Emergency Relief all of the profits.

## Rat Control at Fort Devens

**CAPTAIN GEORGE J. COOGAN**

Sanitary Corps, Army of the United States

An examination was made in February 1944, to observe the type of material going to the post dump at Fort Devens, Mass. The face of the dump is about 30 feet deep and has a 45-degree slope which is maintained throughout its entire depth. About thirty rats were noticed feeding there, and for every rat visible during the day, it was estimated that fifty others probably were present. A few nights later, a fire broke out on the dump and, as the fire trucks entered this area, the headlights showed so many rats that some of the men feared to get down from the fire trucks. Members of the fire department said that at least five or six thousand rats were on the top of the dump alone. From observations made later, it was concluded that the firemen's estimate had not been exaggerated.

As a full-scale rodent extermination program obviously was necessary, advice was obtained from the Division of Predator and Rodent Control, Fish and Wild Life Service, U. S. Department of the Interior, through its regional office. A survey was made of every building on the post and some areas adjacent to the military reservation. The services of an enlisted man with civilian experience in rodent control methods with previous civilian experience in rodent control methods with the Division of Predator and Rodent Control were obtained, and twenty men from the medical sanitary companies were assigned to the project. Although these men had been trained previously as sanitary technicians, lectures and conferences were given to acquaint them with the problem and the methods to be followed. This crew was divided into groups which were assigned to various areas on the post. The exterior of each of the 1,680 buildings was examined for rat burrows, and the interiors of buildings were examined when indicated. A notice was published in the daily bulletin requesting information on any rat infestations noted by other personnel. With the building survey completed, it was known just where rats were to be found. A map showing each building was prepared and all buildings with evidence of rat infestation were bordered in red.

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Condensation of an article published in Public Works Magazine in September 1944.

The following officers and enlisted men assisted in the rodent control program: Lieut. Harold Udell, Sn.C.; Lieut. Arthur Williamson, Sn.C.; Sgt. Joseph Bavis; Pvt. Earl Mineau (formerly with the Division of Rodent and Predator Control); Pvt. Arnold Blake; Pvt. William McGuire, post photographer; sanitary technicians; and Edward C. Hutchinson, U. S. Dept. of Interior, Fish and Wild Life Service.

Lieut. Col. Robert N. Clark, Sn.C., assistant chief, Preventive Medicine Branch, Headquarters First Service Command, edited the material.

Poisoning was considered to be the best method of control. The chance poisoning of pets or the inadvertent transportation of bait was minimized by using bait boxes with openings too small for a cat or dog to reach the bait, which was placed between wooden cleats in the middle of the box through an opening covered by a leather-hinged door.

#### TEST-BAITING

To determine the kind of food acceptable by the rats, one hundred bait

boxes were set out at the dump and also at buildings or stations indicated in red on the map. Fresh carrots, fish, and ground-

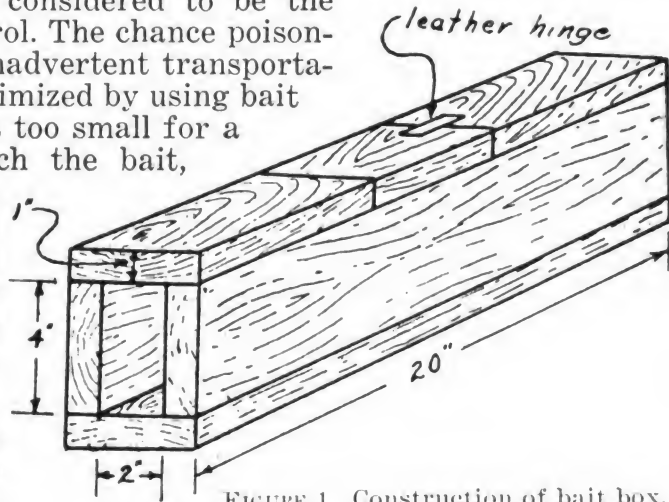


FIGURE 1. Construction of bait box.

FORT DEVENS FEBRUARY 1941				
LOCATION	TYPE OF FOOD	27	28	29
STA #1 Bldg 2093	M	C	C	C
	F	PT	PT	NT
	C	NT	NT	NT
STA #2 Bldg 2090	M	NT	C	C
	F	PT	NT	NT
	C	NT	NT	NT
STA #3 Bldg 2089	M	C	PT	C
	F	NT	PT	PT
	C	NT	NT	NT
STA #4 Bldg 2062	M	C	C	C
	F	NT	NT	NT
	C	NT	PT	PT
STA #5 Bldg 2058	M	PT	C	C
	F	NT	PT	PT
	C	NT	NT	NT
STA #6 Bldg 2048	M	C	C	C
	F	NT	PT	PT
	C	NT	NT	PT
STA #7 Bldg 2028	M	PT	PT	C
	F	NT	PT	NT
	C	NT	PT	NT
STA #8 Bldg 2024	M	PT	C	C
	F	NT	NT	NT
	C	NT	NT	NT
STA #9 Bldg 2018	M	PT	PT	PT
	F	NT	NT	NT
	C	NT	NT	NT
STA #10 Bldg 11	M	NT	PT	PT
	F	PT	PT	PT
	C	NT	NT	NT

FIGURE 2. Record of the results of test baiting.

beef scraps were used in test-baiting for three nights, all three types of bait being placed in each box each night. Two men assigned to each area to be test-baited were made responsible for record-keeping in their area. Should one man not be available, the other would know where the bait stations were and how to keep records in the notebook. A noncommissioned officer was assigned to supervise the project. It cannot be overemphasized that conscientious and dependable men must be used. The method of keeping a record of the results of test-baiting is shown in

figure 2. On the first day, sufficient meat (M), fish (F), and carrots (C) were placed in each of one hundred bait boxes to fill about one-fourth the capacity of the middle portion of the bait box. In the morning the boxes were examined and notes made, if the bait was cleaned out (C), partly taken (PT), or not taken (NT). Separate note was made of each type of bait for each of three nights, and at the end of three nights it was obvious that meat was the most acceptable food, and therefore the bait to use.

#### PRE-BAITING

The purpose of pre-baiting is to train rats to come to a definite fixed place where food is obtainable; also to determine how much food will be eaten by rats that have established an eating habit at that station. Three hundred bait boxes were used at spots where rats were found by the survey, two hundred boxes being placed at the dump. All were numbered and labeled "Poison."

On the first night of pre-baiting, about one-quarter pound of ground beef was used in each bait box, or a total of ninety pounds. The following morning, each box was observed to deter-

mine acceptance of the bait. A record was kept of the amount taken as shown in figure 3. Each vertical column represents a given date, and the sequence of baiting at each station is indicated on a horizontal line. Cross-hatching indicates the proportionate amount of bait used on any particular date; if the box was filled one-quarter full, one-quarter of the space was shaded. If the bait was cleaned out the first night, the letter C was placed above the horizontal line. On the following day the amount of bait was increased to one-half the capacity of the bait box. If

MARCH 1944							
DATE	1	2	3	4	5	6	7
STA #1	C	C	C	C	C	C	C
STA #2	C	C	C	C	C	C	C
STA #3	C	C	C	C	C	C	C
STA #4	C	C	C	C	C	C	C
STA #5	NT	NT	NT	C	C	C	C
STA #6	C	NT	NT	NT	NT	NT	PT
STA #7	NT	PT	PT	NT	PT	C	C
STA #8	C	PT	C	C	C	C	C
STA #9	NT	PT	NT	PT	NT	NT	C
STA #10	NT	PT	NT	PT	NT	NT	PT

FIGURE 3. Record of the amounts taken from the bait boxes.

this was accepted the second night, the amount of bait was increased to three-fourths the capacity of the bait box; and if this was accepted on the third night, the box was filled to capacity and kept filled until the night of poisoning. This is shown on the shaded areas in successive squares.

At station 5, the bait was not accepted the first, second, or third nights. This box, as all others, was filled to one-fourth its capacity. When the bait was not accepted the first night, the same bait was left in the box for the second and third nights. On the fourth night the bait box was cleaned as indicated. On the fifth night this box was increased to three-fourths its capacity, and on examination the following day it was found that the box had been cleaned. On the sixth night the box was filled, and it was found on the seventh day to be cleaned. Poisoning was done the seventh night.

The bait was not taken the first night at station 7. On the second night it was partly taken. Enough new bait was added to make up the one-fourth capacity of the box, and on the third night it was partly taken again and similarly only the amount taken was added to make up the one-fourth capacity of the box. On the fourth night the bait was not taken at all. No new bait was added. On the fifth night it was found that the bait was partly taken, and, as before, bait was added to make the bait box one-fourth full. On the sixth night the box was cleaned. On the seventh day the box was filled to its capacity, and on the eighth day it was found to be cleaned. Poisoned bait was used on the seventh night. Poisoning can be resorted to on the first night, but a study of figure 3 shows that it would not be too successful. The same applies for the second and third nights. Why some boxes were not touched may be explained by the fact that some garbage would invariably reach the dump. Pre-baiting at the dump was in competition with the garbage arriving there. The Norway rat, having been used to garbage, is not easily diverted from customary eating habits. If pre-baiting was continued for twenty or thirty days, it is possible that all rats would be coming to the bait boxes. Economically, this is not desirable. The use of beef was discontinued and horsemeat substituted in pre-baiting when it was found that a large amount would be needed. Horsemeat was found as acceptable as beef if not more so. If no garbage had been deposited at the dump and the garbage already there had been covered with from six inches to a foot of ashes, no difficulty would be experienced in training the rats to come to the bait stations. Those bait boxes placed on the post, from which no bait had been accepted, were taken up on the night of poisoning and brought to the dump where the major infestation was located. The bait in about one hundred boxes at the post had been partially taken or cleaned entirely during the pre-baiting campaign, and these boxes were left there. Dogs and cats tried to get into the bait boxes but were unsuccessful.

Skunks could not enter the box and the mink would not accept the type of bait used. There is no reason to believe that mice were feeding at the bait boxes.

Two hundred bait boxes were to be placed on the top, face, and bottom of the dump, and in the runways to burrows. It was decided to poison on the seventh night because the maximum number of rats were considered to be feeding at the bait boxes by that time. Nearly the same amount of bait was taken on the fifth and sixth nights. Prior to poisoning, a notice was placed in the daily bulletin warning all personnel on the post to restrain pets for forty-eight hours. This precaution was taken because some bait boxes had been tampered with. In fact, fifteen of them had disappeared entirely along with the bait in them, even though they had been clearly marked "Poison" in red. It would be possible that, should the same thing happen on the night of poisoning, the bait would fall onto the ground and any animal that ate it would be killed. Each full station contained enough poison to kill four dogs.

The poison used was zinc phosphide, 2 pounds of which were mixed with 200 pounds of horsemeat. The zinc phosphide, which was obtained from the Division of Predator and Rodent Control, contained zinc, 71 percent, phosphorus, 21 percent, and inert ingredients, 8 percent. It may be obtained as a very fine powder or in the form of a flux for ease in mixing. It has a faint phosphorus odor, is insoluble in water, must be kept dry, and deteriorates with age. Zinc phosphide is very dangerous to use, because it may be absorbed directly through the skin. Rubber gloves were used to mix the zinc phosphide flux with the meat, which operation required two men working about four hours. The horsemeat was ground up and about 20 pounds added to each of 10 metal pails to each of which the zinc phosphide was added and thoroughly mixed with a stick held in rubber-gloved hands. All mixing was done in the open. The pails of poisoned bait were taken by men, each of whom was assigned to a definite number of stations. A little over one-half pound of bait was added to each box and the cover nailed down; then, in case a bait box was knocked over, the bait would not fall out. Where there was danger of bait boxes being picked up around barracks, the boxes were nailed to the base of the building. After the pails had been emptied of poisoned bait, they were thoroughly washed.

On the night of the poisoning, the weather was damp and there was doubt as to whether the rats would be out feeding in large numbers. At nine o'clock that evening the dump was visited to determine whether or not the rats were feeding at the bait stations. They were.

Examination of the boxes on the following day indicated that about 75 or 80 pounds of bait had been taken. More than 200 dead rats were found on the dump. Stations that had been cleaned were filled that night with bait from stations that had not been accepted at all, and boxes at the latter stations were



brought to the dump so that about 125 pounds of bait were placed in 200 stations at the dump. Following the second night of poisoning, about 50 pounds of bait were accepted and another 100 rats were dead on the dump. The number of dead rats could not be accurately determined because of accumulations of trash and cans where rats could hide before dying. Many were covered up by the day's dumping.

On the third night with the aid of a powerful light borrowed from the fire department it was estimated that about 60 percent of the rats had been killed, but the dump was still crawling with rats. Fourteen dead rats were sent to the laboratory of the First Service Command to determine the weight of the amount of food in the stomach, and the weight and length of the rats. The average weight was 398 grams, average length 38.7 cm., and average stomach contents 26.5 grams. The stomachs were distended, indicating little digestion had taken place and that the poison had acted rapidly in those rats that had eaten voraciously.

The number killed was estimated as follows: 125 pounds of bait were eaten, which is equivalent to 56,750 grams. If the average rat ate 26.5 grams,

2,141 rats ate the poisoned bait. However, because rats are in the habit of nibbling and chase each other away from the bait before they finish feeding, and because garbage was available to them, a considerable number probably did not eat so much as 26.5 grams. It was noted that when a rat entered a bait station another entered behind the first one and forced it out on the other side or chased it away. Experiments carried on by the Division of Predator and Rodent Control showed that a lethal dose of zinc phosphide for rats is 25 milligrams per kilogram of body weight. The average weight of the rats being 400 grams, the lethal dose for the average rat would be 10 to 12 milligrams. Therefore, if a rat ate only a gram of poisoned bait (which is equivalent to a nibble), it would die. Thus, it may be assumed that over 3,000 adult rats were killed.

The problem of eradicating 2,000 more rats still remained. Because of the expense of horsemeat, test-baiting with dry poultry mash was tried for three nights, but this was not accepted. The dry mash was then mixed with kitchen fat and while this

TABLE I

*Weights, measurements, and amount of bait in stomachs of poisoned rats*

Sex	Body and tail	Weight	Bait eaten
M	20½ + 19½ cm.	440 grams	28 grams
M	19½ + 18½	375	32.5
F	19½ + 17½	307	27
M	20½ + 18	323	17
F	19½ + 18	322	15.5
M	21½ + 21½	552	31
F	19½ + 17½	287	19
F	20½ + 18½	391	30
M	20½ + 19	403	27
M	22½ + 21	569	42
F	19½ + 17½	328	19
M	20 + 17½	356	29
F	20½ + 17½	435	32
F	21 + 17	491	22
Av. total length, 38.7 cm.		Average weight, 398 grams	Av. amount eaten, 26.5 grams

was accepted a little better, the results still would not warrant its use for poisoning. Three hundred pounds of horsemeat were then ordered and pre-baiting was carried on for four nights, and poisoning was done on the fifth night with thallium sulfate. Thallium sulfate is a heavy, whitish-gray powder having a specific gravity of 6.77, is tasteless, odorless, insoluble in water, does not deteriorate with age, and is a powerful and cumulative poison. It is rapidly absorbed through the skin, is extremely toxic to man, and must be used only with the utmost caution. Even the vapors of a boiling solution of thallium sulfate are toxic.

On the night of poisoning, a 2 percent mixture was used, or about  $3\frac{1}{2}$  pounds of thallium sulfate to 175 pounds of horsemeat. The mixing was done in the same way as with zinc phosphide. All precautions were observed, such as use of rubber gloves, mixing in the open, and use of gas mask. The poisoned bait was placed in about 200 bait stations at the dump that evening. The following day only 15 dead rats were found at the dump. On the day following that, 40 more were found. On the third night an examination was made at the dump and only 12 live rats were counted. An examination was made two nights later and 50 live rats were counted. It was estimated there were probably an additional 300 rats left. The kill with thallium sulfate is much slower than with zinc phosphide. Where zinc phosphide will kill in four to six hours, thallium sulfate will take twenty-four to seventy-two hours, depending on the quantity eaten. About 75 pounds of the 175 pounds of poisoned bait set out was accepted. The lethal dose is 25 milligrams per kilogram of body weight, so it may be estimated that about 2,000 rats were killed with thallium sulfate.

An estimated 300 rats remained, and it was decided to use gas. The number of burrows at the dump cannot be estimated. Two hundred and fifty could be counted easily and there were many that could not be seen in the face of the dump and at the bottom of the dump covered with trash and tin cans, oil drums, and logs. Gassing was tried with hydrocyanic acid gas generated from calcium cyanide, which, using two dust guns, was pumped into the burrows where it would be hydrolyzed and release the cyanide gas. There was no way of telling how many rats were killed by this method.

Some of the burrows were dug out and three to four dead rats were found in each, but these had been poisoned previously. It was found that the burrows were interlacing and some extended distances of 15 to 20 feet. When gas was introduced in one burrow, the rat ran out another opening. Effectively to block up each burrow would be a tremendous job.

Because of the impracticability of using gas,\* it was decided to use another dose of zinc phosphide. About 12 ounces of zinc phosphide were mixed with 4 pounds of lard, and this

\*Hydrocyanic acid gas is also extremely toxic to man.—Ed.

mixture spread on the slices of 25 loaves of bread. The slices of bread were tossed onto the dump and the following day 38 dead rats were picked up on the dump. The amount of bread eaten could not be determined because of the haphazard way it was thrown onto the dump and the fact that it was covered with trash newly brought to the dump. No estimate could be made of the number of rats destroyed in this manner. Further observations at night indicated however, that the rat population had declined to a point where a rat problem no longer existed. To prevent further rat infestation, the dump is being covered over and is to be abandoned. The sanitary fill method of dumping is to take its place.

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## Relapsing Vivax Malaria .

A clinical study was made at the Harmon General Hospital in Texas of 435 soldiers evacuated from islands in the South Pacific where malaria is endemic. All had relatively prompt treatment of acute attacks both in endemic and non-endemic areas, and all but 4 had attacks prior to admission. At Harmon General Hospital, where these men were observed from one to seven months, only 8 patients gave a history of proved, and 12 others of possible, attacks of malaria prior to exposure in the South Pacific Area. It is not believed that there was any exposure to malaria at Harmon. All had suppressive treatment in the endemic area, mostly with atabrine, 0.4 and 0.6 gm. weekly, but no suppressive treatment was given at Harmon. All relapses observed at this general hospital, except one mixed infection with *P. falciparum*, were due solely to *P. vivax*.

As soon as symptoms of an attack developed, the blood was examined for malaria parasites and the patient transferred to a ward for treatment. Specific treatment was never begun until after a smear had been taken, but during the first three months of the study, treatment was begun without waiting for the report of the smear, if the symptoms were typical; 97 percent of these smears were reported positive; during the last four months, treatment was begun only if the smear was positive and the patient's temperature was 100° F. or more.

Thirty percent of the patients were admitted to Harmon General Hospital within three months, 26 percent in four to six months, 24 percent in seven to nine months, and 20 percent in ten to twelve months following evacuation from the endemic zone, and this period in almost every case was spent on non-endemic islands in the South Pacific, except for the period of traveling back to the United States. During the period in the

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Abstract of a paper by Major Harry H. Gordon, M.C., Major Stuart W. Lippincott, M.C., Colonel Alexander Marble, M.C., Major Albert L. Ball, M.C., Captain Lester D. Ellerbrook, Sn.C., and First Lieut. Walter W. Glass, Jr., M.C., to be published in the Archives of Internal Medicine.

nonendemic area, suppressive therapy was used either not at all or for short periods after arrival; relapses were treated promptly. As was to be expected, the longer the known duration of infection, i. e., from the first clinical attack until admission to Harmon General Hospital, the greater the number of attacks. Among 98 men, for example, in whom the infection was of four to six months' duration, only 14 percent had had more than seven attacks, whereas 62 percent of men whose infection was of ten to twelve months' duration had more than seven attacks. Four men had no attacks prior to admission to Harmon General Hospital and for 2 of them the intervals between cessation of suppressive atabrine therapy and the initial malarial attack were 57 and 92 days, respectively. For the other two, the intervals were 187 and 205 days.

During the periods of observation at Harmon General Hospital, a total of 421 clinical attacks occurred in 295 or 68 percent of the 435 patients, 200 having one attack, 72, two attacks, 19, three attacks, and 5, four attacks. Of the 139 patients with no attacks, 47 had been observed for only one month at the time of this report. Definite prodromal symptoms before the onset of a chill, chilly feeling or high fever, occurred in 73 percent of 245 attacks, the most common being headache, backache, weakness, or generalized aches, and less frequently nausea, abdominal discomfort, and aching testicles. The majority of patients could predict an impending attack.

#### CLINICAL MANIFESTATIONS

Adequate records were available for analysis of the clinical manifestations in 355 of the 421 attacks. In 80 percent of the attacks, there was a chill which almost always occurred before the institution of treatment. In a few, the diagnosis was made on symptoms other than a chill, plus the finding of parasites in the smear; treatment was then instituted but it did not always prevent the chill. In 96 percent of cases there was headache; in 97 percent, weakness and malaise; in 88 percent, backache and generalized aches; and in 47 percent, complaints of abdominal pain. Herpes occurred in 27 percent of the attacks and tinnitus in 26 percent. In some patients tinnitus occurred before any medication, and in others, after quinine or atabrine had been administered. Close questioning of those whose tinnitus persisted after the fever had subsided revealed that tinnitus was frequently a residual of exposure to gunfire and was aggravated by the malarial attacks.

Cerebral symptoms were conspicuously infrequent (8 percent) in these relapses of *vivax* malaria. Momentary disorientation and marked change in disposition, dizziness, drowsiness, and fainting were occasionally noted. Two patients became unconscious within one-half hour after the onset of chills, but in both patients the symptoms subsided within two hours. One of these patients had a psychoneurosis manifested by returning attacks of anxiety while under observation. A third patient

was disoriented for a few minutes at the height of his fever, and a fourth had an attack of hysterical hyperventilation on the second day of malarial recurrence; however, since 17 years of age he had many such attacks without malaria. A fifth patient, who for a month before his attack manifested peculiar behavior, developed evidence of a full-blown psychosis on the second day of treatment with atabrine for a mild malarial attack. Although atabrine was given for only seven days, his psychotic symptoms persisted for over three months until discharge to a Veterans' hospital with the diagnosis of dementia praecox. Another patient suffering from mental deficiency developed mental confusion on the seventh day of atabrine treatment, but the acute symptoms subsided within a day after cessation of atabrine. This is the only patient in whom mental symptoms could be attributed to atabrine.

The spleen was felt transiently in 23 percent of the acute attacks and what enlargement took place was not striking. This may have been related to the prompt institution of treatment, both past and present. The longer the duration of known infection and the greater the number of previous attacks, the higher the incidence of palpable spleens during the acute attack.

In 42 percent of the attacks, the maximum temperatures were between 103° and 104.8° F.; in 11 percent they were less than 99.8°; and in 6 percent, 105° or higher.

#### RESPONSE TO TREATMENT

In all but one patient there was a prompt subsidence of acute symptoms following institution of treatment, the details of which are given by the authors. The relative mildness of the acute attacks was manifested by the infrequent cerebral manifestations, vomiting, and other troublesome symptoms and by the prompt response to treatment. Because of this mildness, atabrine given by mouth has sufficed almost exclusively for treatment of the acute attack.

In spite of the immediate response to treatment, the large number of relapses presented a significant problem. First, good medical care for each attack required that the soldier be hospitalized for a week or ten days. Second, a large number of patients complained on admission of not feeling up to par between attacks. Evaluation of these symptoms has been difficult. In about two-thirds of 300 patients, the admission weight was 10 pounds or more below their stated usual weight. About two-thirds of 135 patients complained of headache for which, with few exceptions, no organic cause could be found. About one-half of 140 patients had ill-defined gastro-intestinal complaints, chiefly anorexia. About two-thirds of 123 patients complained of nervousness, including insomnia. Fifty-two of 128 patients had complaints referable to the eyes, 17 of whom were found to have refractive errors. In 31 of 123 patients with complaints referable to the ears, special examinations in



twelve revealed slight impairment of hearing, but it could not be decided whether this was related to malaria, quinine, or exposure to gunfire. Of 28 men whose backache led to an orthopedic examination, 15 had arthritis, poor posture, or a definite history of back strain. It is difficult to say to what extent these residual symptoms could be attributed to malaria, to other infections suffered in the South Pacific, or to the physical and mental rigors endured. In contrast there was a small minority of patients with a history of multiple attacks of malaria who showed no signs of either emotional or physical disability.

#### REHABILITATION

The need for a program of rehabilitation soon became obvious and two barracks were opened where, after admission to the detachment of convalescent malarial patients, they were interviewed and assigned to duties in and about the hospital. The results of this program were gratifying. The reconditioning program benefited the great majority of patients and permitted discharge to duty in far better condition than on admission to the hospital.

#### PROGNOSIS

Data are presented on the rate of relapses after evacuation from the endemic area in each of four convoys. The period of direct observation at Harmon General Hospital averaged 5.3, 5, 3.5, and 1 month for the four groups, respectively. In each group, a striking drop took place in the percentage of men having malarial attacks, in comparison to those suffered during previous months for which data were obtained on history without supporting documents. These results confirmed the clinical impression, gained from observation, that the disease in these men was dying out.



Convalescent mules of the Fifth Army in pasture at a veterinary unit in Italy. Signal Corps photograph.

## Evacuation of Patients at a United States Port

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and

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The role of Transportation Corps ports of embarkation in the overseas movement of troops is familiar to many, but few know the part they play in the return of soldier patients to the United States. The Chief of Transportation and the commanders of ports are responsible for the sea evacuation of patients from the time they leave the control of the overseas commander until they are released to the commanding general of a service command. The point at which patients become the responsibility of the service command is determined by agreement between the service and port commanders.

The responsibility of the commanders of U. S. ports is translated into action when commanders of overseas bases call for assistance. The call is expressed primarily in a monthly report of the sick and wounded requiring evacuation and is directed to the port of embarkation charged with responsibility for the supply of the base. As the need demands, hospital ships (figure 1) are dispatched to overseas bases where patients are awaiting evacuation. Patients may be returned on personnel transports and transport aircraft, also.



FIGURE 1. United States Army hospital ship *Thistle*.

To plan for moving patients through the port, the commander of the home port of a hospital ship must know the expected time of arrival of the ship and the number of patients by class. This information is sent by radio within twenty-four hours after departure of the hospital ship from the overseas port. Occasionally information is sent in advance of departure.

The report shows also the service status and number of officers, enlisted men, and females. Direct communication is authorized between overseas commands and ports of embarkation for purposes of obtaining such other information as may facilitate operations. Advance information specifying the rank or grade, name, serial number, military occupational specialty number, arm or service, class of patient, diagnosis, and geographic state of preference for hospitalization is essential. Evacuation orders, transmitted from the overseas base to the U. S. port of destination so as to arrive prior to the ship, contain all of this information except the diagnosis and the geographic state of preference.

The War Department has designated the four classes of patients as follows: mental, hospital litter, hospital ambulant, and troop class.

1. *Mental.* In this group is found all types of mental cases from major psychoses to mild psychoneuroses. However, as this classification is made to facilitate transportation (and not to record the medical diagnosis), it has been found practicable to consider mental patients as (a) strict and security mental cases requiring locked accommodations aboard ship and (b) open ward mental patients not requiring security accommodations. Open ward patients may be moved similarly to ambulant and troop class patients. Occasionally patients of the strict or security mental types become disturbed during the voyage and require individual locked cell accommodations.

2. *Hospital litter.* These are patients who require hospital care and because of their physical condition must be transported by litter.

3. *Hospital ambulant.* These are patients who, while ambulant, require certain hospital care en route and, in addition, require medical services from other individuals.

4. *Troop class.* These are patients who need little hospital care en route and are able to take care of themselves in an emergency.

In evacuation from overseas by hospital ships, first consideration is given the "helpless fraction" of the patients. The order of priority is generally (1) all female patients, (2) litter patients, (3) the more serious mental patients, (4) hospital ambulant patients requiring considerable medical attention, (5) other hospital ambulant patients, (6) other mental patients, and (7) troop class patients.

Port commanders are notified, on departure of the hospital ship from the overseas base and again at a specified time during the voyage, of the expected time of arrival. However, storms, mechanical failure, and other unforeseen difficulties delay ships. When possible, notice of delay in arrival is transmitted to the port commander. A ship possibly may appear before the expected time of arrival. It is essential that the procedure for evacuating sick and wounded through a port be flexible because the operation must proceed with utmost efficiency as soon after arrival as possible. For the safety of patients, evacuation of the ship takes place only in daylight. The exact time for the procedure to take place is specified in an evacuation order published by the port headquarters.

A ship is met in the harbor by a boarding party consisting of the superintendent of the water division, who is in command of the boarding party; the port surgeon; the port evacuation officer, port surgeon's office; G-4; the public relations officer; and the customs officer. In addition, the port commander usually authorizes representatives of the service command to accompany the boarding party for purposes of predesignating the patients to wards in the debarkation hospital. Operations are most satisfactory when the boarding party is limited to a minimum number of individuals.

During the time required for the ship to move to the dock, the boarding party completes its preparations for the evacuation process. The port surgeon confers with the hospital ship commander and inspects the ship and the medical personnel. The port evacuation officer contacts the ship's commander, registrar, and evacuation officer to check the number and classification of patients. For ships arriving for the first time, instructions are given for the removal of the field medical jackets and the contents, x-rays, W.D., A.G.O. Forms No. 66-1, and the prescribed reports prepared by the hospital ship commander. In the absence of previous experience on a ship the port evacuation officer inspects the ship's internal arrangement for the purpose of directing a safe and speedy movement of the patients to the deck. Special attention is paid the assembly area, corridors, stairways, and other critical points. On completion of this inspection, the port evacuation officer contacts the assistant port evacuation officer on the deck by means of a "Handy Talkie" radio to arrange last-minute adjustments. The superintendent of the water division contacts the ship's commander and the ship's master and directs the docking operation.

On boarding the ship, the personnel from the service command mark each evacuee with a tag which indicates the ward in the debarkation hospital to which the patient will be moved. The tags are prepared prior to the arrival of the ship and the tagging of the patients is completed before the ship docks. In addition to the ward tag, each patient has a debarkation tag (figure 2) fastened to his outer clothing, revealing the name, rank, serial number, class of patient, and brief diagnosis. This tag is prepared by the personnel of the hospital ship's complement during the voyage, and the lower portion is perforated so that a stub may be torn off as the pa-



FIGURE 2. Patient wearing ward tag and debarkation tag.

tient leaves the ship; the stub, showing the name, rank, serial number, and service classification, serves as a receipt for each patient debarked. It is subsequently checked against the roster of patients. As the ship now is ready for evacuation, the preparations that take place on the dock may be examined.

Although there is a standing operation procedure for evacuation of patients through the port, each hospital ship must be given separate consideration. The principal items that must be determined for each ship are the time of evacuation and the personnel, facilities, and services required.

The port surgeon must make an estimate of the number of personnel needed: medical officers, mental, bus, and ambulance attendants, litter bearers, ambulance drivers, luggage carriers, and runners. This estimate varies with the number of patients to be evacuated. The number of personnel required by the provost marshal, superintendent of the water division, and others concerned is more constant.

The motor transportation requirements are calculated by the method described earlier by Scott.<sup>1</sup> The basic factors are: (1) the type vehicle required by each class of patient, (2) vehicle capacities for patients, (3) average rate at which patients are moved from the hospital ship and delivered to the vehicles at the loading point, and (4) average time required for a round trip to the debarkation hospital including loading and unloading. There is little difference in time involved in moving vehicles from the port to the hospital and return because of speed regulations, and there is little change in the type of vehicle required or the patient capacities. However, the arrangement of ships and increased efficiency of personnel tend to make differences that require constant adjustment. The port surgeon arranges for the ambulances and determines the number and types of busses provided by the port transportation officer.

In estimating motor transportation requirements, it is not necessary to discriminate between ambulant and troop class patients, as both classes are moved by bus. A Medical Corps officer and enlisted attendants are assigned to each bus. Twenty-five percent of the rated bus passenger capacity should be reserved for patients' personal effects, attendants, patients with particular kinds of injuries such as those requiring unwieldy casts (figure 3), and patients on crutches. Violent or restraint patients are normally transported two to an ambulance, each patient being accompanied by two attendants, but a patient may be so violent as to require a separate ambulance and additional attendants. Potentially violent, watch, security, or strict type patients are moved by bus. One Medical Corps officer and six attendants to each bus provide sufficient care en route. Ten percent of the bus capacity should be reserved for personal effects in the hands of patients. This is an important consideration because patients become disturbed on being

1. Scott, Thomas G.: Motor Transportation Requirements for Shiplide Evacuation of Sick and Wounded, *Military Review*, 24:39-41, August 1944.



separated from personal effects. Normally there are four litter patients to an ambulance; however, separate accommodations may be required where contagious diseases are involved.

The rate at which different classes of patients are moved from the ship to the dock should be determined for each port. They vary with differences in methods and types of facilities employed. During the first operations at a port and in the absence of other data, the following figures are suggested for planning purposes: ambulant and troop class, each 6 seconds; violent or restraint type patients, one each 30 seconds; potentially violent, watch, security, or strict types, one each 12 seconds; and litter patients, one each 30 seconds. It is advis-

able to measure the rate of evacuation by class for each evacuation because the statistics obtained provide a standard for operations. In interpreting the figures, however, it is not enough simply to note that the rate was slower or faster than a previous operation. It is necessary to search for the cause of the difference. For example, a large number of difficult litter patients may slow down the rate for that class of patient. Troop class



FIGURE 3. Patient with unwieldy cast.

and ambulant patients with an exceptional amount of hand baggage may slow the movement of those classes. Mental patients, disturbed by the excitement of coming home, may give trouble. There is little remedy for these occurrences. Some causes of slow rates of movement—improper control of the flow of patients, narrow corridors, steep stairs, insufficient litters, narrow gangplanks—may be subject to correction.

The rates at which patients have been moved from the ships to the dock over a single gangplank for eighteen operations are summarized in table I. On one occasion 168 litter patients were moved at the rate of 0.23 minutes per patient.

Litters remain with the patients as they are delivered to the debarkation hospital in order to avoid holding up the ambu-



lances. On the day following the evacuation, it is advisable to collect the litters, blankets, sheets, and pillows from the hospital to which the patients have been delivered. The litters should be immediately dressed and stored in readiness for the next operation.

The port surgeon notifies all concerned of the expected time of arrival of the hospital ship, and assigned responsibilities are carried out according to agreement. The port band is set up on the dock to welcome the patients and plays throughout the evacuation except during removal of certain mental patients. Red Cross officials are on hand and the Red Cross canteen is in position to serve patients as they move out of the port area. The provost marshal provides police protection on the ship and in the dock area and controls traffic along the route to and from the debarkation hospital.

The assistant evacuation officer, port surgeon's office, who is in command on the dock, has a command post with signal communications in a central location on the dock. Two hours prior to arrival of the ship, this officer makes a final check of all



FIGURE 4. Scene on dock apron immediately prior to start of evacuation operations.

arrangements to determine that all is in order. He also makes last-minute adjustments directed by the port surgeon or port evacuation officer by means of radio communication with the ship. He is in control of the movement of patients at the dock side of the gangplank, and calls for vehicles, personnel, and litters as needed. By the time the ship is made fast and the gangplank placed, everything is ready for the movement of patients from the ship to the dock and from the dock to the debarkation hospital (figure 4).

The port evacuation officer is responsible to the port surgeon for the entire operation of the evacuation procedure and supervises the activities of the medical officers and enlisted men, on the ship and on the dock. He maintains control from

TABLE I

*Rate of movement from ship to dock in minutes per patient*

Class of patient	Average time for all operations	Fastest	Slowest
Ambulant and troop	.13	.09	.17
Violent or re-strait mental	.59	.35	.84
Strict or security mental	.17	.10	.22
Litter	.44	.31	.57

the assembly area at the head of the gangplank and directs the flow of patients from the ship to the dock. When the port evacuation officer leaves the assembly area to inspect other phases of the operation, an assistant is left in charge at this point. Liaison is maintained with the ship's evacuation officer who maintains contact with the wards and cabins and with the medical officers, nurses, and enlisted men of the hospital ship's complement. The ship's evacuation officer on request of the port evacuation officer, transmits instructions by means of runners or public address system to the ship's personnel on duty in the wards during the evacuation. Such hazardous places on the ship as steep stairways, sharp turns, and narrow passageways are staffed by medical personnel assigned by the port evacuation officer. With the gangplank in place, the evacuation of patients to the dock commences. The order of removal of patients is as follows:

1. *Army.* (a) Ambulatory and troop class. (b) Mental—potentially violent or watch cases. (c) Mental—violent or restraint patients. (d) Litter cases.

2. *Navy.* (a) Ambulatory and troop class. (b) Mental—potentially violent or watch cases. (c) Mental—violent or restraint patients. (d) Litter cases.

3. *Merchant Marine.* (a) Ambulatory and troop class. (b) Mental—potentially violent or watch cases. (c) Mental—violent or restraint patients. (d) Litter cases.

4. *Civilians.*

Because of their location in the ship and because they usually go to different wards in the debarkation hospital, it is generally convenient to take the patients of each class off in the following order: officers, nurses, enlisted men, and civilians. Civilians must not leave the ship until their entry is approved by the immigration officials. Civilians with hospitalization authorized in Army hospitals are moved with the other Army patients.

Evacuation begins by calling for all officers of the ambulatory or troop class type to proceed to the assembly area at the head of the gangplank. As they move to the gangplank, each patient is handed a card with instructions concerning the importance of not revealing information about overseas experiences, or impressions or opinions based on experiences, except to the proper authority. Enlisted men are assigned to assist all patients who may have difficulty carrying their baggage. Patients are aided aboard a bus stationed at the gangplank, and their luggage is placed near them. After leaving the dock area, the bus stops at the Red Cross canteen where doughnuts, coffee, candy, and ice cream are served. The bus then continues to the debarkation hospital without further interruption and after leaving the patients at the designated wards, immediately returns to the dock area for further use if necessary.

The potentially violent security or watch type of mental patient is the next group to be evacuated. Trained mental attendants are sent to the wards on the ship where the patients are assigned, and one attendant accompanies each patient as far as the bus. A medical officer, with enlisted attendants, accompanies each bus.

In transporting the violent or restraint type of mental patients, all precautions must be taken to prevent them from harming themselves. Trained attendants are sent to the appropriate wards on the ship and, under the direction of medical officers, two attendants are assigned to each patient. The tags for this class are retained by the medical officer of the hospitalship's complement and are turned over to the port evacuation officer at this time. An occasional patient is removed in restraint, and infrequently a patient of this type has to be moved on a litter.

When the mental patients have been removed, the wards are notified to prepare litter patients for evacuation, and litter bearers are sent to the wards. Medical personnel within the ship direct the flow of traffic from the wards and corridors and also the oncoming empty litters to the wards. The flow of litters must be planned for each ship. A constant movement of litters from the ship may be maintained by evacuating simultaneously from several wards. The use of four litter bearers to the litter is considered advisable (figure 5).

Minor complications may arise during the removal of litter patients. Patients who wear casts that extend beyond the

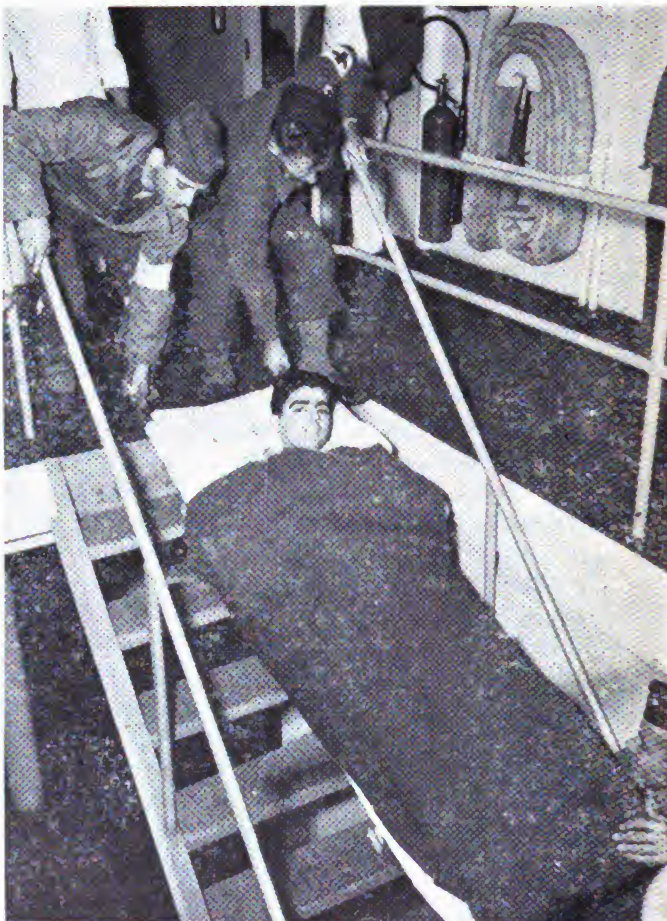


FIGURE 5. Litter bearers descending difficult stair.



litter require space normally allotted to two patients. As a result, some ambulances may leave with three patients instead of four. Carriers of contagious diseases may be sent in separate ambulances. Rarely is a seriously ill patient moved from the ship, but if necessary, a single ambulance may be used.

In the evacuation procedure are plans for the evacuation of vermin-infested patients and their contacts, including the necessary disinfestation. Such patients should be evacuated last. Experience indicates there is only a slight possibility that delousing procedures will be required in evacuating hospital ships.

No personnel other than those directly concerned with supervision or operation of the evacuation should be present. Occasionally, certain observers who will later have to perform in connection with the evacuation should be allowed to witness the operation. No personnel should be allowed to remain who have completed their assignment, and those with duties requiring repeated visits should avoid interference with the evacuation process.

From prior planning to operation, all phases of evacuation demand utmost cooperation and understanding among the command, staff, and operating elements. Evacuation is subject to change, and all plans should be made flexible. Personnel concerned with evacuation should be constantly on the alert to refine and improve procedures. The sick and wounded are impatient to debark, and delays are damaging to morale. A rapid, smooth, uninterrupted flow of patients from the ship to the dock and from the dock to the debarkation hospital is the keynote objective.

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**Dental Caries and Fluorine.**—The importance of the fluorine content in drinking water to dental health has been proved. The possibility of reducing the incidence of mottled enamel by substituting a water supply of low or optimum fluorine content has been proved. The possibility of reducing the incidence of dental caries by enriching drinking water with fluorine seems very probable but has not yet been proved and will not be proved for at least ten years. The topical application of 2 percent sodium fluoride to teeth seems to be a safe and a partly successful method of preventing dental caries. From present data, it would seem that the most that could be expected from either method would be a 50 percent reduction in the incidence of caries. While this is an impressive and very worthwhile result which justifies further research and effort, it cannot be regarded as the final answer to the problem. In fact, it promises to be almost exactly half the answer. In other words, some other factors, not as yet understood, are equally important in the causation of dental caries. The interest in the fluorine-dental relation should continue and should expand, but it should not exclude an equal interest in researches into the cause of the other 50 percent of dental caries. (John Landsbury, M.D., associate professor of medicine, Temple University. Medical Clinics of North America, November 1944, p. 1433. Philadelphia: W. B. Saunders Co.)

## Experiences with the Gastroscope

JOHN TILDEN HOWARD, M.D.

"What is the real value of gastroscopy?" is a question frequently asked. Is it used to impress certain patients with the thoroughness of their examinations or is it valuable in the diagnosis of gastric disease? From my experience in the last six years, I have gradually formed an opinion. It has seemed that others have been able to see more inflammatory disease of the gastric mucosa than I have been able to find. When I was learning the technique of gastroscopy, all dispensary patients and a few private patients were potential candidates for the study, although the contraindications to gastroscopy were always observed. When it became known that gastroscopy was being done, many difficult cases were referred, chiefly patients who had unexplained gross hemorrhages from the upper gastro-intestinal tract and negative roentgen studies. The gastroscopic examination was not of positive value in any of these early cases seen. Either I was too inept to find the lesions or gastric erosions had disappeared under treatment. However, a group of us continued to use the gastroscope on cases with known gastric carcinomata, with roentgenologically proved gastric ulcers, with presumably benign gastric adenomata, and with undiagnosed gastric pathology, so we might learn the gastroscopic appearance of lesions known to be present.

### GASTRIC CARCINOMATA

In almost all cases of carcinoma recognized by the x-ray, the tumor could be seen gastroscopically. Some growths of the pylorus were missed because the narrow lumen into the canalized tumor were mistaken for the pylorus. Now I keep under suspicion every pylorus that does not open and close when it is watched through the gastroscope. The mucosa at the proximal end of a nonobstructing tumor of the pylorus may show no more than a mild gastritis. In six years I have had only two patients in whom a carcinoma was found first with the gastroscope and subsequently with the x-ray.

A locomotive engineer, fifty-four years of age, consulted us in September 1939. He had pain under his left costal margin for two or three months. In the summer of 1939, during a period of nervous strain, he first had pain under the left costal margin. It would waken him at night and would annoy him just before the noon meal. The pain would be relieved

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Condensation of a paper read before the Section on Gastroenterology, Southern Medical Association, St. Louis, Missouri, 15 November 1944.

From the Clinic for Gastro-Intestinal, Nutritional, and Hematopoietic Diseases, the Johns Hopkins Hospital, Baltimore.



by soda and not by food. His appetite had been and continued to be excellent. His physician had sent him to a hospital maintained by his railroad and there roentgen examinations of his upper gastro-intestinal tract had been negative. A test meal had showed a hyperacidity. When the physicians had found no objective evidence of organic disease, they had written his doctor to say they felt that he was worried about himself and about a fancied cancer because his friend had died of carcinoma. In spite of reassurance the patient felt that all was not well in his abdomen and he came to Baltimore. His physical and laboratory examinations were negative, except that there were positive tests for occult blood in the stool. There was an adequate gastric acidity, for after an Ewald test meal the acids were 48 and 66.

Fluoroscopic examination of the stomach and duodenum was negative except for some irregularity, such as might be caused by large rugal folds, high on the greater curvature. With the gastroscope we could see an ulcer well up on the greater curvature. The rugae around it were very coarse and there was a definite gastritis about the ulcer. The patient was sent home on ulcer therapy. Over the next two months the ulcer was observed several times and finally, on 6 November 1939, we remarked that the lesion looked like a malignancy. The patient was admitted to the hospital for surgical exploration and there he was studied again with the x-ray. The rugal folds were very heavy and the first roentgenologist diagnosed, "Large rugal folds, probably representing a gastritis." We passed the gastroscope a fourth time and again saw the lesion. Later that day a second roentgenologist reviewed the films, asked for a clinical history before making a report, and he said, "Defect on the posterior wall of the cardiac end of the stomach which is due to an ulcerative lesion." On 15 November 1939, Dr. Rienhoff explored the abdomen and resected the distal four-fifths of the stomach. On the greater curvature was an ulcer the size of a half dollar. Sections of the ulcer showed it was malignant. There were no evidences of metastasis and the patient was generally and digestively well when heard from in September of this year.

The gastroscope has been of assistance, too, in studying filling defects shown in skiagrams of the stomach but not definitely diagnosed by the clinician. One cannot always rule out gross gastric pathology with a negative gastroscopic examination. Indeed, such an examination does not mean too much to me; we can depend on positive gastroscopic findings only. With the gastroscope I may overlook too easily an organic lesion, especially when it is high on the posterior gastric wall. Sometimes both the gastroscope and the x-ray miss the gross pathology.

A married woman, sixty-four years of age, was seen in August 1938 for symptoms which suggested a functional dyspepsia of long standing. She weighed 95 pounds, was markedly arteriosclerotic, and nothing was found on laboratory examination. Eight months later she had a hemorrhage from the upper gastro-intestinal tract and was hospitalized. With recovery from the bleeding, the patient had a roentgen examination of her stomach and duodenum and they were said to be normal. Gastroscopic examination revealed a mild atrophic gastritis. I answered the queries of the patient and her family with, "The bleeding probably came from a gastritis." The patient apparently recovered completely from the hemorrhage and her hemoglobin rose to 98 percent. Six months after the hemorrhage she weighed a little over 100 pounds. She was not heard from again until

August 1940, when she said that in June of that year she began to have vague dyspepsia with abdominal distention, constipation, and hemorrhoids. Then she was found to be anemic; there were ascites and gastric achlorhydria. The skiagrams showed a filling defect on the lesser curvature and the posterior wall of the stomach from the presence of the neoplasm. Gastroscopic examination was done with the greatest ease and this time we could see a very definite carcinoma. However, it was too late to do our patient any good and she died in a few months.

#### GASTRIC ULCER

I have failed to see many benign gastric ulcers through the gastroscope. I have seen some but too often I search in vain for lesions clearly shown on the x-ray film. Sometimes a gastric ulcer is seen satisfactorily and it usually can be differentiated from a carcinoma gastroscopically. After a few weeks of treatment during which a probable ulcer becomes smaller but does not disappear, one may worry about the nature of the lesion. If, in such a case, a benign-looking ulcer can be seen with the gastroscope, one will be inclined to continue with medical therapy. If the films were his only criterion of cure, he might advise exploration, for malignant ulcers may become smaller on medical therapy.

#### MARGINAL AND JEJUNAL ULCERS

In most patients with gastro-enterostomies the stoma can be seen gastroscopically. In patients who have had Polya resections of their stomachs, practically all the stomata can be visualized with the gastroscope. Occasionally a marginal ulcer can be seen. Most of the anastomotic peptic ulcers are in the jejunum and I have not been fortunate enough to get sufficient light to see even one. Of course, gastritis around the stoma is a common finding in patients who have had an artificial opening made in the stomach and I have been unable to correlate this finding with the symptoms.

#### GASTRITIS

The diagnosis of chronic gastritis is the unchallenged field of gastroscopy. The condition of the stomach's mucosa can be determined very much better by direct inspection than by the study of its secretions or from the rugal pattern on roentgenograms. Very frequently the height of the rugae is controlled by the tone of the muscularis mucosae and elevated folds seen on the skiagrams can be ironed out by the inflation of the stomach with air. One may see reddening of the mucosa, edema, ulcerations resembling canker sores, and a granular mucosa; sometimes nodules are seen on the folds; then there may be atrophy of the gastric mucosa with striking thinning of a blue-gray color. While all gastroscopists see this evidence of mucosal inflammation, the difficulty lies in its proper interpretation. We may see gastritis, even with erosions, but we have been unable to correlate the findings with chronic symptoms. To find a hypertrophic gastritis with striking erosions

in a symptom-free patient alters one's concept of the significance of the findings, and so does the very frequent observation that patients with gastroscopically demonstrated gastritis get on better with barbiturates than with demulcents and with diets from which gastric irritants are eliminated.

I said in 1940 that chronic gastritis is an interesting finding but that too often symptoms are erroneously ascribed to it. I hold that same idea now. I often report a "red stomach" rather than gastritis, and I do not understand its clinical significance. I believe that it is usually clinically insignificant.

Gastroscopy enables us to visualize most gastric tumors, some gastric ulcers, and to diagnose more properly gastritis, but gastroscopy rarely reveals an ulcer or a tumor which the x-ray fails to demonstrate, and, at present, roentgenography is by far the more dependable method for the objective demonstration of the coarser gastric lesion. The gastroscope is a useful adjunct, but it does not supplant the x-ray.

The diagnosis of chronic gastritis is interesting but, when found, it usually is not of great clinical importance. The clinical courses of patients who have vague upper abdominal symptoms and, as their sole objective finding, chronic gastritis, suggest that these symptoms are more likely to be on a psychogenic basis than to be manifestations of gastritis. Many men who are doing gastroscopy will disagree with this statement but, as I said before this Section in 1940, the great diagnostic assistance obtained from gastroscopy will be limited to the study of the coarser lesions, such as ulcers and tumors, and the demonstration of bleeding areas. To this I now may add: The gastroscopic demonstration of gross lesions is of the greatest importance, but a negative gastroscopic examination does not exclude the possibility of gastric ulceration or tumor.



U. S. Army "medics" at work in the fury of tank warfare. One "medic" is ahead of the flames of exploding ammunition in a disabled tank; another "medic" cares for a wounded man near the tank in the foreground. Bayon, France, 12 September 1944. Signal Corps photograph.

## Hemolytic Streptococcus Pneumonia

One of the remarkable contrasts in medical problems of the present war and those of World War I is the relative unimportance of pneumonia due to the hemolytic streptococcus during the present conflict and its extreme importance in World War I. The rarity of this syndrome in recent times and the availability of chemotherapeutic agents of high potency should not lead to the dangerous assumption that streptococcus pneumonia will not be a serious problem in the Army before demobilization. The following facts deserve serious consideration: (1) It is not unlikely that there will yet occur a combination of epidemiological factors which will result in a greatly increased incidence of streptococcus pneumonia. For military communities which commonly have a high incidence of streptococcus disease in late winter the occurrence of an epidemic of influenza at that time might result in an important outbreak of streptococcus pneumonia. (2) The diagnosis of streptococcus pneumonia is frequently difficult. (3) Successful therapy depends on early and assured diagnosis, comprehensive understanding of streptococcus disease, and intelligent, expeditious, and persistent use of the best procedures. (4) Close correlation of therapeutic and preventive measures may be of great importance under some circumstances.

### DIAGNOSTIC FEATURES

The greatest importance must be attached in diagnosis of pneumonia to the clinical picture during the first twenty-four hours of illness. The early manifestations of streptococcus pneumonia resemble those of other bacterial pneumonias; however, in its commonest clinical form, streptococcus pneumonia has important features in common with primary atypical pneumonia. These two syndromes have the following similarities: (1) The pathologic lesion is predominantly interstitial. (2) Physical signs are not usually striking or easy to evaluate and in many cases consist of only a few sibilant or medium rales over the involved lung. When streptococcus pneumonia is lobular in character or when there is empyema, physical findings are a prominent part of the picture. (3) The x-ray findings are usually of the same sort in the two syndromes. (4) The clinical response of streptococcus pneumonia to chemotherapy with either sulfonamides or penicillin is often neither immediate nor dramatic and might improperly be used as argument for diagnosis of atypical pneumonia in a given case.

The clinical picture of hemolytic streptococcus pneumonia differs from that of primary atypical pneumonia in that: (1)

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From the Medical Consultants Division, Surgeon General's Office.

The onset is sudden and usually marked by a shaking chill. Most commonly the individual has had symptoms of an infectious disease for several days before onset of pneumonia for which he is perhaps being hospitalized at the time pneumonia begins. (2) Cyanosis is the rule, though exceptional in atypical pneumonia. On account of the facial flush, cyanosis is not obvious to those who have had no experience with "red cyanosis." (3) Increased respiratory rate brought out or greatly accentuated by slight exertion is a feature of streptococcus pneumonia and is rare in primary atypical pneumonia. (4) Prostration is less severe for comparable severity of attack. In fact, the severely ill patient with streptococcus pneumonia may show exhilaration and state emphatically that he does not feel sick. (5) Either scarlatiniform rash, peripheral vascular collapse, or shock occurs with significant frequency early in streptococcus pneumonia and they are extremely rare in atypical pneumonia. (6) Leukocytosis is the rule while it is the exception and when present is slight in atypical pneumonia. Streptococcus pneumonia cannot be excluded by a low or normal leukocyte count because some of the severest attacks do not show leukocytosis.

Assured diagnosis, particularly of the sporadic case of streptococcus pneumonia without empyema, requires good clinical bacteriology. Direct examination of stained smears of sputum are often misleading because of the difficulty of differentiation of streptococci and pneumococci in smears. Tests for capsule swelling by the use of specific antipneumococcus antisera aid early differentiation. Comprehensive bacteriologic diagnosis calls for culture of sputum on blood agar plates, isolation in pure culture, and test for bile solubility. Determination of the Lancefield type is a procedure for the laboratory with unusual bacteriologic facilities.

*Empyema.* When empyema complicates streptococcus pneumonia, there are added to the clinical picture the following features: (1) Chest pain which suggests inflammation of the pleura. Perhaps a friction rub is heard. (2) Clinical evidence of fluid in the pleural cavity. (3) Increased dyspnea, cyanosis, and systemic intoxication as compared with uncomplicated cases. Hemolytic streptococcus empyema tends to appear early in the course of the pneumonia. Indeed, in many cases the invasion of the pleura appears from the clinical evidence to be simultaneous with parenchymal involvement. When this occurs, the early clinical picture may imitate closely that of acute pneumococcus pneumonia. A patient who has had a "bad cold" for three or four days has a shaking chill followed by one-sided chest pains, cough, blood-streaked sputum. When examined he is found to be cyanotic, breathing rapidly, and the chest shows splinting on the painful side; an area of dullness or flatness is made out over which breath sounds may be diminished or not. A friction rub is probably heard superior or lateral to the area of flatness. Not infrequently, the diagnosis suggested is lobar pneumonia, when



actually the case is one of streptococcus pneumonia with early empyema. The most important differential points are: (1) In streptococcus pneumonia, fluid is detected in the pleural space early in the attack and accumulates with remarkable rapidity so that one side of the chest appears to be filled with fluid within twenty-four hours after the first evidences of pleural fluid are detected. *Such rapid accumulation of pleural fluid in a patient with a severe acute infection is highly diagnostic.* The clinical diagnosis is made with assurance by examining the pleural fluid which is found to be thin pus. On standing a *clot does not form* but a gray sediment is deposited. Smear or culture of the sediment shows great numbers of streptococci. Streptococcus pneumonia differs in other respects in its early stages from pneumococcus pneumonia. The chest pain is not likely to be so sharply aggravated by each inspiration as in lobar pneumonia. The sputum is not sticky or "prune juice," but thin and streaked with fresh blood, if, indeed, blood is present at all. A common cause for missing the diagnosis of streptococcus pneumonia is the assumption that pneumonia in a patient with measles is due to the virus of measles. Measles virus pneumonia is rare and usually occurs in a fulminating attack in which pneumonia is manifested early. Any pneumonia appearing after the diagnosis of measles is established should be treated as bacterial pneumonia.

#### TREATMENT

The successful treatment of streptococcus pneumonia depends upon the following factors: (1) Early diagnosis. (2) Early initiation and vigorous and persistent prosecution of all necessary forms of treatment: (a) proper use of chemotherapy; (b) prompt and repeated aspiration of pus from the pleural space; (c) proper use of surgery in cases which require it; (d) prompt treatment of shock or anoxia; (e) provision for fluid intake during the toxic stages of the disease sufficient to maintain optimal flow of urine.

*Chemotherapy.* Reported studies of treatment of streptococcus pneumonia with modern therapeutic agents are insufficient for a mature choice of agent or technique. The best information indicates that effectiveness of available drugs may be in the following order: (1) penicillin, (2) sulfadiazine, (3) sulfanilamide. Penicillin has two distinct advantages over the sulfonamides in the treatment of streptococcus pneumonia complicated by empyema. One of the greatest advantages of the use of penicillin in treating severe streptococcus pneumonia is its lack of toxicity. If the patient with streptococcus pneumonia happens to be sensitive to the sulfonamide employed, severe kidney injury with anuria may result. Kidney injury may, in fact, be the result of severe streptococcus intoxication alone just as it may result from sulfonamide sensitivity reaction alone. Penicillin injected into an empyema cavity is highly effective in sterilizing the contents, while sulfonamide drugs used in like manner have little antibacterial effect. Penicillin should be

given intramuscularly every two or three hours around the clock 25,000 to 40,000 units per dose. When there is empyema, penicillin should be injected into the pleural space at the earliest possible moment. Preparations for such injections should usually be complete before the diagnostic aspiration is made. Concentrated solution of penicillin in physiologic saline solution may be irritating to the pleural surfaces and may aggravate exudation. A good plan is to remove all the pus possible and then to inject 30,000 to 40,000 units of penicillin contained in 30 to 55 cc. of isotonic salt solution. The injection should be on alternate days for three or more doses. If sulfadiazine is to be used and there is no reason to believe that the patient is sensitive to sulfonamides, it is recommended that the initial dose be 4 grams and that the patient receive 2 grams every four hours around the clock. Fluid intake should be sufficient to give a daily urine output of 2,000 cc. or greater. If only sulfanilamide is available, the following plan is recommended for the average adult: 4 grams as the initial dose, and 1 gram every four hours. Chemotherapy should be continued until its purpose has been accomplished or evidence of failure is convincing. Decision that chemotherapy has failed should not be arrived at hastily because prompt cure or even immediate improvement is not the invariable rule.

*Aspiration of pus.* During the first day or two of illness, removal of pus from the pleural cavity may be necessary to save life even though chemotherapy is employed. During the first two or three days aspiration every twenty-four hours is recommended; thereafter, removal on alternate days is usually sufficient. Aspiration should be continued as long as pus can be obtained or until improvement ceases, when rib resection should be considered. The dangers of rib resection during the acute toxic stage of illness are well known. During the later stages of the disease, removal of 10 to 20 cc. of pus, even if sterile, from a previously undetected intralobular pocket is usually followed by disappearance of fever and striking improvement of tachycardia and dyspnea.

Patients with virus diseases, such as influenza and measles, are peculiarly susceptible to streptococcus diseases during hospitalization. All feasible steps should be taken to prevent transmission of streptococcus infection to hospital patients. Rigid isolation of individuals with streptococcus disease, strict measures for the control of dust in hospital wards and corridors, and the best use of chemoprophylaxis are all indicated. While one gram per day of sulfadiazine has been shown to be highly effective in protecting certain groups of well individuals from streptococcus infection, it is likely that larger doses are necessary for the protection of individuals with either influenza or measles under severe conditions which may apply at times in hospitals. A dose of 4 grams per day is recommended.

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Early Management of Wounds of the Hand

LIEUT. COLONEL CONDUCT W. CUTLER, JR.

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Of all battle wounds seen in military hospitals, it has been estimated that the extremities are involved in nearly 75 per cent, among which injuries of the hand are common. The increased opportunity to observe these injuries has increased our knowledge of the fundamental principles of emergency hand surgery; likewise, valuable experience is being gained in dealing with problems of late reparative and reconstructive procedures. There is a close relation between the early and the late phases of treatment. The surgeon who deals with these wounds at the battlefield, giving them their first definitive treatment, in large measure predetermines the course of events. On his judgment and skill depend the final results to be obtained by the plastic and reconstructive surgeon in restoring a useful member. The more one encounters this type of injury the more he becomes convinced of the importance of the fundamental principle of the conservation of tissue. It is with the application of this principle to war wounds of the hand that this paper is concerned.

The major principle of tissue conservation has certain corollaries: (1) The retention of all possible viable tissue, even to the extent of chancing the viability of important structures, and there are few structures of the hand that are not functionally important. (2) The local control of destructive infection by the extirpation of definitely nonviable tissue, by the removal of contaminating foreign matter, the avoidance of adding infection, protection of the injury against fresh invading organisms, and adequate provision for the escape of the products of infection. (3) Restoration of normal physical relation of the parts of the injured hand, and the protection of these parts against further injury or displacement. (4) An early restoration of function and the avoidance of relegating any of the working structures of the hand to uselessness by contractures, cicatrices, fibrosis, or atrophy.

Consideration of the types of hand injury most commonly encountered, with respect to early management, will illustrate the application of these principles.

*Burns.* Much advance has been made in understanding the nature of these injuries and, in consequence, their management has become increasingly effective. Destruction of tissue by

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Read at Surgical Conference of Northeastern District, Medical Department, A.A.F., Patterson Field, 23 September 1944.

the application of escharotics or coagulants is now deplored, and the concept of the burned area as being an open wound, singularly vulnerable to contamination, has led to further conservation by the aseptic precautions employed in the initial dressing. Vigorous scrubbing and excision of damaged skin and unopened blisters has given way to gentle cleansing. Damaging antiseptics are replaced by the local application, by some surgeons, of bacteriostatic chemical agents, which, if they do no good, at best do no harm to damaged cells. The emollient protective dressing of fine-meshed, well-impregnated gauze is designed to be innocuous and nonadherent.

Frequent changes of dressing, with their opportunities for contamination and their disturbance of granulating and epithelizing surfaces, have been abandoned. The infiltration and edema, so common a cause of collagenous deposit, are more or less controlled by the application of dressings providing even, firm pressure, like the pressure dressings of Sumner Koch. Rest of the part, too, is provided by these measures, and healing is permitted to progress undisturbed for as long as fourteen days at a time.

One of the greatest advances in the early treatment of burns of the hand is the development of the "skin dressing"—the early-applied covering skin graft which promotes early healing and prevents deep cicatrization and subsequent contracture. Severe burns of the hands, if properly dressed at the outset, require no further care for ten days to two weeks, permitting evacuation of the patient to general hospitals. Here, at the earliest possible moment, dermatome grafts may be applied. Whether such grafts form an appropriate surface or not, they constitute the best method of producing early healing, thus preparing the patient at an early date for the reconstructive work of the plastic surgeon. In these, as in the other injuries to be considered, the importance of protective immobilization in the position of function and the avoidance of flat splinting is to be emphasized. The advantages of early mobilization, early directed active motion, and the various physiotherapeutic procedures are not to be ignored.

*Puncture wounds and perforating wounds.* The significance of this type of injury lies not so much in the damage produced by the wound itself, although important structures may be injured and require repair, as it does in the destructive infection which may be introduced. Since the orifice of such a wound is small in proportion to its depth and since contaminating organisms may be carried deep into the tissues, this type of wound is particularly liable to infection. Unless this infection is forestalled or quickly recognized, its possibilities for mischief are great. Most of the infections of the tissue spaces of the hands, so ably described by Kanavel and so dreaded by surgeons, were at some stage of their inception neglected or unnoted puncture wounds.

The definitive repair of deep structures that may be damaged by such a wound has no place in emergency front-line surgery. The most that can be done there is the evaluation of the nature and extent of the injury, the arrest of hemorrhage, if necessary, and the protective dressing and immobilization of the hand.

The local application of sulfonamides may be of value in the prevention of infection. More important is the cleansing of surrounding skin areas and the assurance of a ready means of exit for blood, serum, and the products of infection. To this end, the surgeon operating at a forward hospital should not hesitate to enlarge the orifices of puncture or perforating wounds where contamination in the depths is probable. The employment of a small rubber tissue drain to assure the maintenance of this opening is defensible in some instances as a prophylactic measure. Such a drain should always provide a channel, never act as a plug.

These measures should ensure reasonable safety during the period of evacuation or for a few days of retention at a forward hospital. Should no active infection develop, the drain may be withdrawn after four or five days. If infection is established, the access of the involved area to the surface is a fairly effective safeguard against its spread into the vulnerable structures of the hand.

*Foreign bodies.* While, in warfare, foreign bodies are likely to be found in all sorts of wounds, in many instances extraneous substances are introduced through wounds resembling punctures in all essential particulars. In battle casualties wood, stones, steel splinters, or bullets may be introduced into the depths of the hand through small orifice wounds. In dealing with these, especially in forward areas, the principles observed in the treatment of puncture wounds are applicable. Rarely is it possible or expedient to attempt the localization and removal of small foreign bodies in the hand under these conditions. Facilities, time, and the pressure of more urgent cases forbid it; yet, treated as puncture wounds, such cases may with reasonable safety be transported to hospitals farther in the rear for definitive surgery. Here, careful evaluation of the situation will convince the surgeon as to the advisability of removing the foreign body and will determine the appropriate time. While, in general, it is considered good practice to remove these foreign bodies, certain of them are best left alone. Often an attempt at removal of an innocuous metallic foreign body from the hand is productive of greater damage to its structures than the presence of the fragment itself. Conservation of structure and function demands that these be left alone. The same considerations require that the operation for removal, when this is undertaken, be done only after accurate localization and with the advantages of operating room conditions, full anesthesia, good lighting, proper instruments, adequate assistance, and a bloodless field. Otherwise, much



loss of time and injury of tissue or even failure of the attempt may result.

*Incised and lacerated wounds.* The surgical principles governing the treatment of all soft tissue injuries under battle conditions obtain with regard to wounds of the hand inflicted by cutting or lacerating agents. There is this important difference between hand injuries and injuries of less functionally important body areas. Débridement should be minimal, consistent with safety. All available skin must be conserved and any structure which may live should be retained *in situ*. Suturing should not be done, but wounds should be left open for subsequent repair. Local sulfonamide powder, the light application of grease gauze between the lips of the débrided wounds, and the application of a protective and immobilizing dressing should suffice for the emergency treatment.

At the time of the wound toilet, bleeding vessels should be controlled and ligated, and severed nerve ends should be lightly approximated or identified by insertion of metal sutures. Pending the eventual repair of nerves and the subsequent restoration of effective muscular innervation, the tone and circulation of these latter structures must be preserved by appropriate physical measures and protected, by proper support in the position of function, against the pull of their opponents. The mobilization splint of Feltner (*The Bulletin*, No. 80, page 20, September 1944) may be used to advantage. Made of plaster and ladder splint material and fitted with rubber traction slings for the fingers, it provides support and permits desired motion.

Tendons, if damaged, should not be sutured primarily under battle conditions or in busy evacuation hospitals. This applies, particularly, to tendons divided within the digital canal. The opinions of Iselin<sup>1</sup> and others<sup>2 3</sup> have been fully borne out by experience. They have never observed satisfactory results from the primary suture of flexor tendons in the sheaths of the fingers. As this is true in civilian casualties, it is certainly true under battle conditions.

If work is not too pressing, if the injury is seen sufficiently early, and if it is not too much contaminated, the primary repair of extensor tendons is occasionally justifiable. Rarely do these criteria exist in evacuation hospitals of combat areas. It is therefore better to treat such wounds as suggested and leave definitive repair of tendons and nerves to the better facilities and less crowded conditions in general hospitals. For the repair of flexor tendons, especially those divided within the digital canal, it is better to await full healing of the superficial wound and the complete subsidence of inflammation.

1. Iselin, Marc: *Chirurgie de la Main*. Paris: Masson et Cie, 1933.

2. Koch, S. L., and Mason, M. L.: Division of Nerves and Tendons of Hand, with Discussion of Surgical Treatment and Its Results, 56:1-39, Jan. 1933.

3. Cutler, C. W., Jr.: *The Hand: Its Disabilities and Diseases*, p. 248. Philadelphia: W. B. Saunders Co., 1942.

The repair of these structures is a delicate and often tedious procedure, requiring skill and optimum conditions for its performance if satisfactory results are to be obtained.

Until repair can be effected, dressings for protection and immobilization should be so arranged as to maintain the divided tendons in the position of greatest relaxation.

*Fractures and dislocations.* Simple fractures of the bones of the hand and dislocations of finger and carpal bones are not rare in combat zones. Usually these do not present serious problems of management, although they are disabling temporarily and often must result in the soldier's evacuation from forward areas. Reduction and retention of fractures of metacarpals and phalanges properly take into account the normal concavity of the palmar surfaces of these bones. When the hand is in the "position of function," these concavities become continuous to present a semicircular contour of the palmar aspects of the bones in the partially flexed hand. Hence, this is the position in which the fractures and reduced bones are best immobilized to prevent angulation. Flat splinting is to be avoided. Often, in fractures hard to reduce or retain, recourse must be taken to the application of elastic skeletal traction by means of a needle through the distal phalanx, and to the ever useful "banjo" splint.

The chief difficulty with fractures of the carpal bones, particularly of the most frequently injured navicular, is failure of recognition. Even if a patent fracture of one of these bones is suspected, two-way x-ray exposures may fail to reveal it. I have been inclined to recommend that in these cases four exposures of the carpus be made: anteroposterior, lateral, and two oblique. It is the fractures of the navicular that are not recognized, and hence come late to treatment, that most frequently fail to heal. Open reduction or removal of fragments is rarely necessary now that we have adopted the plan of fully immobilizing these fractures without delay and for periods of at least four months. Such prolonged immobilization alone interferes little with joint function. Dislocations of the carpal bones often require open reduction, as does the complex dislocation of phalanges, especially the metacarpophalangeal joint of the thumb. Recognizing this fact, the surgeons of forward areas soon learn to avoid excessive attempts to reduce these injuries by manipulation. If one good attempt under general anesthesia relaxation fails, the patient had best be evacuated and spared further tissue damage.

*Compound fractures and major wounds.* Many of the injuries of the hand received in combat involve compounding injuries of the bones, with most of which is associated considerable damage of soft tissue structures. Tendons, nerves, blood vessels, and muscles are often divided, shredded, torn, or partially lost. Dirt, clothing, or metallic foreign bodies may lie within the damaged structures. Often the situation is anatomically chaotic and any semblance of functional restora-

tion may appear well-nigh hopeless. Such major injuries of the hand may result in severe hemorrhage. Also more than injuries of comparable magnitude elsewhere—in the thighs, arms, legs, or back, for example—they are productive of shock. Hence, the first treatment must be the combating of the effects of shock or bleeding, or both, on the systemic level. Shock is to be anticipated, its premonitory evidence looked for, and its development prevented. When the patient's condition permits operation, general anesthesia should be induced and appropriate preparation of the area undertaken. The first step is the control of hemorrhage by clamping and ligating of bleeding points. Ligation of the radial artery at the wrist may sometimes be necessary but is to be avoided if possible. The more distally the ligation of bleeding vessels in the hand can be accomplished, the more important tissue will survive. Next comes the removal of foreign material and a careful débridement of the damaged tissues. Thoroughness, with maximum conservation of useful structures, is particularly important here. Every bit of skin that may survive must be saved. Lacerated tendons and nerves should be dealt with as previously outlined. If parts of them have been lost, they should not be unduly shortened. Only dead muscle should be excised; only free bone fragments should be removed. Bones that are badly shattered should not necessarily condemn a finger to amputation. A hand should not be sacrificed by amputation merely because it looks like a hopelessly irretrievable mess. Each exposed structure should be examined and retained or sacrificed on the basis of its individual viability. By pursuing this policy, a great many useful hand elements may be preserved.

Reduction and maintenance of fractures of the bones, often comminuted, are best accomplished by the use of skeletal traction and the banjo splint. Supporting, immobilizing, and protective dressings are applied, the wound being left open. If vasospasm compromises or threatens the validity of the circulation of the damaged hand, the advantages of cervical sympathetic block should not be overlooked. Little more can be done when the patient has reached a general hospital than the definitive removal of tissues, originally saved, because potentially viable, which have not survived. Once this has been accomplished, early healing of the denuded areas is the first desideratum. For this purpose the free use of dermatome grafts has proved most valuable. Plastic and restorative work must come later, weeks or even months after the wounds are healed.

*Amputations.* The principle of conservation of tissue is nowhere better illustrated than in its application to traumatic amputations of the hands. What is lost is gone. What remains should be saved if possible. Potentially useful tissue of the hand should never be sacrificed to considerations of time or expediency.

We have seen parts of fingers all but completely severed, with only one digital artery, perhaps, retained, that, held in place with a couple of loose skin sutures and firmly splinted, have surprisingly survived in whole or in part. Such a digit may be worth much to its owner in the pursuance of his occupation. Especially is this true of the thumb. The preservation of a finger is well worth the effort. Should it not survive, nothing more has been lost.

When a finger or part of it has been completely severed, I am strongly of the opinion that the principles governing amputations elsewhere, as so clearly and forcefully stated by The Surgeon General, should govern here also. The stump should be cleansed, débrided if necessary, and left to heal. The policy of immediate formal flap amputation, often involving disarticulation of the remaining portion of a phalanx, is to be deplored. To be sure, time is saved, but at the expense of finger length. If the stump is left open and protected by an appropriate dressing (an open thimble of x-ray film serves the purpose), granulations soon cover it and epithelization may be hastened by the addition of a few Reverdin grafts. The result is a finger a little longer than that left by the trauma, not shorter, and a functioning joint may, in addition, be preserved. The total salvage may be as much as three-fourths inch. If the traumatic amputation be ragged and irregular rather than guillotined, any shreds of skin that can be preserved will be most useful in eventually covering the granulating surface.

If there be a question as to the applicability of this principle of conservation to amputations of the fingers, surely there can be no doubt of its appropriateness with respect to major traumatic amputations of the hand. The formal and accepted types of hand amputation, devised before the days of the present development of plastic and reconstructive surgery, have a place only in dealing with new growths and certain chronic infections. They have no place in traumatic surgery today. However badly shattered the hand may be, it is the business of the military surgeons in forward hospitals to preserve every part of it that will survive. It is the endeavor of surgeons in the general hospitals to promote the healing of the remaining stump at the earliest possible date, freely employing skin grafts for the purpose. It remains for the skilled orthopedist and plastic surgeon to restore the best anatomical adjustment and the best functional use to the parts that remain.

In the interest of the injured soldier, whose future occupation and livelihood depend largely on his manual equipment, in the interest of the reconstructive surgeon, whose skill will utilize to the utmost advantage all that remains of injured hands, we must religiously save everything we can of these valuable members from the wreckage of war.

## A Gastro-Intestinal Outpatient Service

CAPTAIN MAX MAGNES

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The handling of gastro-intestinal patients in the Army varies as new problems arise in the various stations. In a station hospital in the zone of the interior, over a period of two years, an equal number of functional and organic cases was found on the gastro-intestinal service. In a large general hospital in the states, 85 percent of the patients on the gastro-intestinal service had organic findings. However, in the European Theater of Operations, prior to the invasion, all the medical wards in our general hospital could have been filled with functional gastro-intestinal patients, if all stomach patients had been hospitalized (as recommended by the battalion surgeons). In six weeks, 204 cases were seen in consultation through the outpatient department. In spite of this relatively large number, each soldier was given a thorough history and physical examination, and these, in many cases, were sufficient to rule out organic disease. This was confirmed by follow-up interviews.

Peptic ulcers in the Army have been discussed frequently in periodicals,<sup>1</sup> stress having been placed on prevalence and high incidence. Other phases of this problem, such as complications, treatment, and disposition of peptic ulcers apparently appear simple and conclusive. What could be simpler than making a diagnosis of duodenal ulcer, treating with an ulcer regimen, and discharging the patient from the service? In the states, such a routine involves no difficulty, but in the theater of operations, difficulties arise which require solutions temporarily devised for that time and place. This general hospital in the ETO, prior to the invasion, functioned as both a general and a station hospital. In the latter capacity, troops from the surrounding area were serviced, supplementing the work of the battalion and regimental surgeons. The difficulties involved did not concern the hospital cases, but the tremendous outpatient service.

The cases seen on consultation in the outpatient department were the more severe or puzzling cases that could not be controlled medically by the battalion or regimental surgeon. These cases were expected by the unit medical officer to be hospitalized or completely investigated with laboratory tests including a gastro-intestinal x-ray series. With limited bed capacity and a shortage of x-ray films, the desires of the battalion and regimental surgeons could not be carried out. Nor was it necessary

1. Tidy, Henry: Peptic Ulcer and Dyspepsia in the Army, Brit. M. J., 2:473-477, 16 October 1943.



or expedient to hospitalize or x-ray all the gastro-intestinal patients who did not respond favorably to treatment at their own dispensaries. A plan of checking these patients thoroughly with minimum x-rays and without hospitalization was adopted in the gastro-intestinal outpatient consultation service. Although realizing that most of the referred gastro-intestinal patients had functional complaints, careful history and physical examinations were done on these soldiers. In this way, 73 percent of the soldiers were eliminated from hospitalization and x-ray investigation. The other 27 percent with suspicious clinical pictures were told to return and careful fluoroscopies were done by the gastro-intestinal service in conjunction with the radiology department.

TABLE I

*Common symptoms of 204 soldiers appearing in the outpatient department of the consultation gastro-intestinal service*

	Number of patients	Percent
Upper abdominal distress (Pain, bloating, "gas," pressure)	153	75
Vomiting	92	45
Pyrosis	41	20
Diarrhea (chronic)	15	7

The most surprising point in reviewing the histories of the 56 patients who were fluoroscoped and x-rayed is the typical ulcer history they gave and the large proportion of negative findings among them. Those who showed any suspicious abnormalities with fluoroscopy, such as an irregular duodenal cap or undue irritability of the pylorus or duodenum, were x-rayed. In this manner, the number of hospitalizations and gastro-intestinal series were reduced to a minimum without passing up any organic lesions of the stomach or duodenum.

TABLE II

*Duration of symptoms of 204 patients*

	Number of patients	Percent
5 years and over	32	15
1 to 5 years	69	34
6 to 12 months	26	13
3 to 6 months	12	6
Less than 3 months	65	32

Naturally the ulcer cases were hospitalized. Suspected gall bladder cases were given cholecystographic studies through the outpatient department. Colon cases were proctoscoped and only given barium enemas when the history or physical or sigmoidoscopic examinations warranted such a procedure. If any organic conditions of the digestive system were missed, they were probably mild cases of chronic cholecystitis, because cases with stones will give a more typical clinical picture of a gall-bladder condition. The latter cases will be suspected on history or physical examination, and hospitalization or x-rays will be resorted to.

This method of checking suspicious cases by fluoroscopy is open to criticism because of the possibility of missing some defects. For this reason we want to emphasize that suspicious fluoroscopies were x-rayed. Furthermore, we have placed reliance

on the fluoroscopy because the individuals under examination in the Army have far less abdominal depth and adipose tissue than the average civilian. This makes x-ray penetration much easier. In addition, after the first few swallows of barium, the silhouette of the stomach and duodenum on the fluoroscopic screen was made sharper by the drinking of a heavier mixture of barium sulfate. The primary motive in thoroughly checking the large number of consultation, gastro-intestinal outpatients was to detect all the ulcer cases and to eliminate them from any combat units before the start of hostilities. Company officers are convinced that ulcer patients are a constant source of irritation to the men around them.<sup>2</sup>

A common digestive complaint in the ETO was vomiting. Forty-five percent of the outpatients had this complaint. This symptom alone was present in 5 percent of the cases. Compared to the prevalence of the symptom in the hospitals of the zone of the interior, it was far greater in this theater of operations. The probable factor in producing this symptom was the tension of the preinvasion period. Contributing and probably precipitating factors were the field rations and the psychologic effects of mess kits. Occasionally men were seen in the "chow line" with dishes instead of mess kits. On being questioned, they admitted that they vomited when eating from mess kits. In a civilian gastro-intestinal practice, the symptoms of vomiting, in addition to other digestive complaints, usually has the significance of an advanced organic disease, mainly that of a pyloric obstruction, due to a stenotic ulcer or carcinoma at the pyloric end of the stomach. The ease with which vomiting is produced by the nervous soldier is in sharp contrast to the comparative rarity of the symptom in a civilian gastro-intestinal practice.

The preinvasion jitters produced a tension in some of the officers and men of the invasion forces. Tense with anticipation, these men developed many functional symptoms, the most prominent of which were digestive in character.<sup>3</sup> Unusually high was the prevalence of pylorospasm, evidenced by bloating, ulcerlike pains, and heartburn and, when associated with reverse peristalsis, causing vomiting. The pylorus acts under various influences. The degree of acidity of the stomach, the consistency of the intestinal contents, and nervous influences play the biggest roles in controlling this sphincter. Other factors, as the type of food in the stomach and the condition of the small intestine and colon, also affect the pyloric sphincter.

Distress in the upper abdomen, ranging from mild pressure to sharp pain, occurred in 75 percent of the gastro-intestinal cases. There were very few cases that had symptoms referable to the gall bladder or bowel, because these organs produce acute

2. Rush, Alexander: Gastrointestinal Disturbances in the Combat Area: Preliminary Observations on Peptic Ulcer, *J. A. M. A.*, 123:389-391, 16 October 1943.

3. Kirk, Robert C.: Peptic Ulcer at Fort Sill, *Am. J. Digest. Dis.*, 10:411-413, November 1943.

symptoms and the patients are directly hospitalized. Chronic diarrheas of a functional nature were seen in 7 percent of the consultations. Two patients with unexplained, mild gastro-intestinal symptoms lasting for seven and ten days were found to have a very mild icterus of the sclerae due to a mild acute hepatitis. This was confirmed by the elevated van den Bergh test, positive hippuric acid test, and the palpable liver.

The large number of functional cases known as neurasthenia gastrica, unstable colon, and pylorospasm were augmented by the anticipated invasion. These patients having an ulcerlike syndrome with negative x-ray findings were cases of pylorospasm and were the ones that required thorough checking. In all these cases, nervous influences predominated and an aggravating role was played by nicotine. The average consumption of cigarettes among these men amounted to thirty per day which was sufficient to cause disturbances of the autonomic system. The withdrawal of cigarettes and the administration of a mixture of belladonna and bromide cleared up the symptoms in most cases in a short time. From a gastro-intestinal viewpoint, it is unfortunate that cigarettes are so plentiful overseas. Incidentally, the relative scarcity of alcohol in the United Kingdom did not reduce the number of gastro-intestinal cases, confirming the view of some gastroenterologists that alcohol, outside of producing an acute gastritis in excessive doses, does not as a rule produce any chronic pathology in the digestive tract.

Although a large number of patients gave a typical ulcer history it was surprising how few showed any lesion such as a deformity, fleck, or niche on fluoroscopy or x-ray. Irritable or nonfilling duodenal caps were rechecked after a week's treatment with tincture of belladonna. A history of a tarry stool was occasionally given, but not too much credence could be given to this symptom because the soldier either did not know what a tarry stool looked like or was intentionally falsifying. Of the eight cases that gave a history of a tarry stool, only one was definitely proved by digital examination. The others were ruled out by the absence of anemia and of negative fluoroscopies.

#### SUMMARY

1. During the preinvasion period, 4.5 percent of gastro-intestinal cases were quiescent peptic ulcers that lit up because of the excitement and tension. Many of the cases, however, were nervous functional cases that had ulcerlike symptoms with negative gastro-intestinal fluoroscopy or x-ray.

2. The problem of hospitalizing or doing a gastro-intestinal series on every soldier referred for consultation through our outpatient department was an impossible one. In six weeks, 204 gastro-intestinal patients were seen in consultation through the outpatient department. This was in addition to the regular gastro-intestinal ward service which ran an average census of twenty-five beds. The primary aim was to eliminate any peptic

ulcers from the units before they went into combat.

3. The routine of fluoroscopic suspicious ulcer cases can be used by hospitals where a large number of troops are serviced in any theater of operations. The importance of a careful history in gastro-intestinal cases should not be minimized.<sup>4 5</sup>

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4. Love, H. R.: Dyspeptic Symptoms in Soldiers, *Med. J. Australia*, 2:101-109, 7 August 1943.

5. Rush, Alexander: Gastrointestinal Disturbances in the Combat Area; II Preliminary Observations on Functional Disorders of the Digestive Tract, *J. A. M. A.*, 123:471-473, 23 October 1943.

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## Adjusting the Emotionally Unstable Soldier

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and

CAPTAIN S. R. ROTMAN

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The objective of adjustment at this training center is to aid the disturbed, unstable, neurotic soldier to change from a military liability to a positive military asset. Everyone who comes into the Army has to make adjustments. No one knows where he is going; no one knows where he will end. The neurotic soldier is overwhelmed by the swiftness of the training pace and the conflicting changes between his civilian and the Army way of life. At the induction station he becomes one of many serial numbers. His civilian props are gone; all appears to be confusion. He is kept busy signing documents, being injected with vaccines, traveling from station to station—arriving in the night, hungry and weary. The next morning he is again interviewed; his conflict is deepened; his confusion becomes more acute.

Because of this situation, the Consultation Service<sup>1</sup> has been set up to function as a mental hygiene unit. The staff consists of a director, who is a neuropsychiatrist and is a staff officer of the commanding general; an assistant director, who is a personnel consultant; and enlisted men who are trained psychiatric social workers and psychologists. Also attached to this unit is a Red Cross psychiatric case worker who serves as an assistant Red Cross field director.

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Soldiers are referred to the Consultation Service by regimental and hospital surgeons, chaplains, company commanders, and other interested officers. Some patients are seen once; many return five to ten times, depending on the situation and the treatment required. When these men are referred, they are given a preliminary interview by a psychiatric social worker, and if indicated, a psychometric test. The material is then reviewed by the director, who examines the soldier, and if any organic findings are discovered, he is referred to the proper hospital clinic. If no serious physical conditions are found, a preliminary diagnosis is made by the director and a plan to assist the soldier is outlined.

The director plants the therapeutic seed, gives the soldier insight and reassurance, and informs him that an appointment will be scheduled with an assistant, who is eager to help. During his first visit to the Consultation Service, the neurotic or emotionally unstable soldier receives a "psychological cocktail," consisting of (1) the establishment of rapport and the beginning of the transference; (2) the chance to talk about his past medical, social, and military history, which in addition to relieving tension supplies diagnostic and therapeutic material; (3) the planting of therapeutic ideas, which initiate the beginning of an adjustment to a normal military life.

An important factor in the success of our psychotherapy is that the director and his assistants have had the experience of going through basic military training and, therefore, understand the problems of enlisted men. The director's assistants are either commissioned or noncommissioned officers who are guided by the principle that every man is essential to ultimate victory and no man must be lost. They approach the neurotic soldier with a dynamic, energetic attitude. Their enthusiasm is, in part, due to training which consists of prescribed psychiatric readings, frequent clinics to illustrate points in diagnosis or therapy, together with constant encouragement by the director.

This clinic endeavors to release the soldier's tension and anxiety by giving him insight into the nature of his difficulties, both as to their origin and development; by assisting him to make an adjustment in his present military situation and by preparing him for any eventuality that may ensue as a combat soldier. A fixed and rigid approach does not accomplish results. We deal with a variety of types, backgrounds, education, and intelligence, necessitating variation in psychotherapy. The methods used vary with the individual.

## TREATMENT

Treatment of the neurotic usually follows these broad principles. The soldier is interviewed by the director who listens with respectful interest. The director avoids too much coddling or undue sympathy, as that would undermine the moral fiber of the soldier who must be prepared, in global war, to cope with physical violence, mud, tropical heat, cold, hunger, filth, and disease. The first problem for the director is the unconscious resistance manifested by the soldier to his military situation. No matter how frightened, pride and patriotism compel him to deny his anxiety. Nearly every neurotic soldier when asked will reply that he is not worried. He is told that it would be rather strange for a man who has left his family, friends, and position, with no guarantee that he will ever come back, not to think about his future and possible fate. When the problem is presented this way, he invariably acknowledges his repressed fears and anxiety. The director then points out that this repressed anxiety, fear, and concern produce tension which must go some place or be discharged somewhere and which usually is converted into symptoms. He is told that tension results in backache, painful feet, gastric distress, headaches, or cardiac discomfort, and that as long as he creates or suffers from tension and anxiety, he also most likely will have these persistent physical complaints. The director reassures the soldier that we will try to help him and that he will return in a few days for further assistance.

When the soldier returns, he and an assistant sit down together in the privacy of a cubicle. The assistant tells the soldier that he has been seen by physicians who report that he has no organic disease; that the director, an expert in nervous and mental diseases, found nothing organic; that his condition is an emotional one caused by his manner of living, his family history, his early difficulties in adjustment, and the rapid transition to Army life with all that the change involves; that thousands of others have this condition and most of them have been able to meet the challenge of their present situation, provided they wished to do so. He is assured that nothing serious will happen as a consequence of his complaints.

Following are factors common to the neurotic soldier and the techniques used to meet these problems:

1. The soldier's presence in the Army, away from home, results in a feeling of helplessness. He is then made aware that in reality his presence in the Army means that he is pro-



protecting his home and family from the enemy and that millions of others have the same common purpose. This point of view often bolsters his weakened ego.

2. The director and his assistants endeavor to have the soldier articulate his fears, hostility, and guilt feelings, thereby releasing his tension. When this is accomplished, his innate energy is free to concentrate on the important tasks at hand.

3. The soldier is assured that his feelings and problems are understood. When the interview is over, he must go away with the conviction that his visit has been worth while and that he has received help.

4. We try to handle the problem which confronts every soldier—the threat of the unknown. This threat is reduced by dissipating the exaggerated phantasizing of his dangers. We assist him to come to grips with his anxiety, thus breaking it down bit by bit and saving him from being overwhelmed by the immensity of the unknown.

5. Another common problem is the neurotic soldier's feeling of no longer being an individual, and, finding that he must relinquish his civilian habits, he must sublimate his individual energies to the common purpose of building up a military team so that in the long run we shall preserve our individualism and freedom of action.

6. The director and his assistants help the soldier cultivate new object relationships as a substitute for family ties. Throughout the process of psychotherapy, the soldier is constantly reminded of the director's interest in him, while the assistants constantly keep the director informed of new developments in the soldier. The director is used symbolically as "all-knowing, kind, and all-protecting."

An individual who has a neurotic involvement unconsciously uses his neurosis as an avenue of escape from impending danger. It is quite understandable how frequently the exaggerated neurotic reaction and malingering appear somewhat the same to the uninitiated. The neurotic may appear to some to act or resemble a malingerer, but this impression is erroneous. It is true, however, that many neurotics exaggerate their symptoms. In the many hundred cases which have gone through this Service, an out-and-out malingerer has never been seen. This point is important as many are convinced that neurotics are all "gold bricks" and malingerers. It has become clear that in the majority of cases the complaints manifested by the neurotic soldier are of the pattern followed by one or both

parents who have neurotic symptoms. Our experience with malingering has been confirmed by discussions with Army psychiatrists from general hospitals, station hospitals, air installations, and other units, who report only four cases of malingering in the treatment and handling of thousands of men.

#### RESISTANCE

The problem of resistance is a continuous one. The individual is determined, unconsciously, that he does not desire relief, even though on a conscious level he may say he is willing to fight for his country—"if you can get me well first." We must constantly bear in mind that we are dealing with a traumatized individual. We believe that all soldiers coming to the Consultation Service are traumatized emotionally in a way somewhat analogous to soldiers who have received fractured extremities, lacerated wounds, or visceral injuries, and that the neurotic soldier has been wounded by undue emotions, suffering libidinal deprivation and explosive pressure through infancy and childhood, which have emotionally crippled him when he attempted to carry out the duties of a soldier—that the neurotic soldier's sufferings are as real and devastating as those of soldiers who have received bullet or shrapnel wounds.

In attempts to expedite psychotherapy because of time limitations, we have tried to develop short cuts, such as the use of sodium amytal intravenously in a number of cases, thereby eliciting material in an hour or two which would otherwise take months to ascertain. With the assistance of this material discovered under sodium amytal, we have been able to overcome difficulties that seemed insurmountable.

In addition to psychologic methods used, we are able to manipulate, through Army resources, the environment of the soldier by changing his school, job, or assignment. The director has a unique situation, since he is liaison officer between the clinics, hospital, and various administrative and command officers in the camp. He is thus enabled to facilitate and expedite the problems of the enlisted man. The soldier can be transferred from one company, where he is unhappy or feels he is being abused, to another company, where it is felt he can do more satisfactory work. These measures frequently are conducive to helping the neurotic soldier become stabilized. Our methods and technique offer possibilities that could be followed profitably in civil life with as much success as has been achieved here.

# Verification Tests in Serodiagnosis of Syphilis

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and

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Soon after Wassermann, Neisser, and Bruck<sup>1</sup> developed the complement-fixation test for syphilis, it became evident that positive serologic reactions occur in other conditions. Since the original antigens were prepared from syphilitic liver, it was believed that the test was specific for syphilis. But Landsteiner et al.<sup>2</sup> showed that the active fraction of the liver extract was not a spirochetal substance but rather a lipid substance. Although these lipid extracts are not true antigens in the biologic sense, they react in an extraordinarily specific manner with syphilitic serums. Most positive serologic results are due to syphilis and perhaps represent a type of immunologic reaction, but some positive results may be unrelated to syphilis and represent a general biologic phenomenon. Since false positive reactions may occur in the absence of syphilis, the mere fact that reagins or antibodies have been demonstrated by serodiagnostic procedures cannot be taken as a specific indication that syphilitic infection is present. False positive reactions may occur with a variety of nonsyphilitic infectious diseases and metabolic disturbances and in some individuals who show no evidence of any pathologic state. Preinduction blood tests, compulsory prenatal and premarital blood tests, and the widespread use of serologic testing in medical practice and industry have increased the number of individuals needlessly subjected to antisypilitic treatment.

The false positive reactions which occur with the various serodiagnostic tests for syphilis are either technical or biologic. Technical false positive reactions occur in serums containing no antibody and may be due to technical errors in collecting and labeling specimens, the use of contaminated and hemolyzed specimens, laboratory errors in performing the tests, the use of faulty materials and reagents, or errors in recording or reporting the final results. Biologic false positive reactions may be due to the presence of antibody-like substances similar to the antibodies produced in syphilitic disease, an increase or altera-

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1. Wassermann, A., Neisser, A., and Bruck, C.: Eine serodiagnostische Reaktion bei Syphilis, *Deut. med. Wschr.*, 33:745-746, 10 May 1906.

2. Landsteiner, K., Muller, R., and Potzl, O.: Zur Frage der Komplement-bindungsreaktionen bei Syphilis, *Wein. klin. Wschr.*, 20:1565-1567, 12 Dec. 1907.

tion of the seroglobulin fraction, or an increase or alteration of some chemical substance or substances in the blood. Stokes<sup>3</sup> has enumerated about thirty conditions which render frequent, occasional, or disputed biologically false positive serologic reactions. Investigations at the Army Medical School have disclosed still other diseases and conditions which may cause false positive serologic reactions. In fact, any metabolic disturbance or febrile episode may at times influence the reliability of serodiagnostic tests for syphilis.

The difficulties of basing a diagnosis of syphilis on current serodiagnostic tests alone have been pointed out by Moore, Eagle, and Mohr.<sup>4</sup> They have suggested some sixteen procedures of value in differentiating true from false positive reactions. Many of these procedures require special clinical and laboratory techniques and often necessitate weeks or months of observation and expert syphilologic advice. In view of these conditions there is need for a method which will differentiate the false from the true reactions. Several "verification" or "confirmation" procedures have been proposed for this purpose.<sup>5 6 7 8</sup> Investigators<sup>9 10 11 12</sup> have reported that antigens for complement-fixation tests made from cultured spirochetes are far more specific than tissue extract antigens. Other investigators<sup>13 14</sup> found however the spirochetal test to be no more specific than the routine tests. In the Washington Serological

3. Stokes, J. H.: *Modern Clinical Syphilology*, 2d ed., p. 131. Philadelphia: W. B. Saunders Company, 1934.

4. Moore, J. E., Eagle, H., and Mohr, C. F.: *Biologic False Positive Serologic Tests for Syphilis; Suggested Method of Approach to Their Clinical Study*, J. A. M. A., 115:1602-1606, 9 Nov. 1940.

5a. Hecht, H.: *Zum Wesen der Wassermannschen Reaktion*, Prager med. Wschr., 39:316-317, 18 June 1914; *Eine neue Flockungsreaktion bei Syphilis*, Deut. med. Wschr., 47:1487-1488, 8 Dec. 1921.

b. Hecht, H.: Personal communication, 1940.

6. Wassermann, A.: *Neue experimentelle Forschungen über Syphilis*, Berl. klin. Wschr., 58:193-197, 28 Feb. 1921; *Weitere Mitteilungen über die Zerlegung des Wassermannaggregates und ihre Anwendungsfähigkeit zur Bestätigung der positiven Wassermannschen Reaktion*, Klin. Wschr., 1:1101-1102, 27 May 1922.

7. Wittebsky, E.: *Eine bestätigungsreaktion zur Serodiagnostik der Syphilis*, Zschr. f. Immunforsch. u. exper. Therap., 30:323-335, 5 Oct. 1933.

8a. Kahn, R. L.: *A Serologic Verification Test in the Diagnosis of Latent Syphilis*, Arch. Derm. Syph., Chic., 41:817-830, May 1940.

b. Kahn, R. L.: *The Verification Test in the Serology of Syphilis*, J. Lab. Clin. M., 23:1175-1186, July 1943.

9. Nagell, H.: *Ueber das Vorkommen unspezifischer Hemmungen bei der Wassermannschen Reaktion*, Derm. Wschr., 90:795-802, 14 June, and 90:823-836, 21 June 1930.

10. Capelli, E.: *La "Pallidareazione" di Gaetgens sui sierii lebbrosi*, Glor. batt. immun., 22:425-436, 1939.

11. Patrick, D. W., and Wolfe, D. M.: *Leprosy: Complement Fixation with Gaetgens' Spirochete Antigen Compared with Standard Wassermann and Kahn Tests*, Pub. Health Rep., Wash., 56:1757-1759, 29 Aug. 1941.

12. Eagle, H., Hogan, R. B., Mohr, C. F., and Black, S. H.: *On the Reactivity of the Serum and Spinal Fluid of Leprous Patients with Spirochetal Suspensions*, Am. J. Syph., 25:397-405, July 1941.

13. Heinemann, H.: *Untersuchungen mit der Pallidareaktion*, Derm. Wschr., 94:680-689, 14 May 1932; and *Über die Praktische Brauchbarkeit der Pallidareaktion im Arbeitskreis des Tropenarztes*, Arch. Schiffs Tropenhyg., 36:9-19, 1932.

14. Kolmer, J. A., Kast, C. C., and Lynch, E. R.: *Studies on the Role of Spirochaeta Pallida in the Wassermann Reaction; Complement Fixation in Syphilis, Leprosy, and Malaria with Spirochetal Antigens*, Am. J. Syph., 25:300-318, May 1941.

Conference<sup>15</sup> both Richter and Eagle participated with the spirochetal antigen complement-fixation tests as well as with the standard procedures employing lipoid antigens. More false positive serologic reactions were obtained in some nonsyphilitic diseases with the spirochetal antigens than with the lipoid antigens; however, in the leprosy group the incidence of false positive reactions was considerably lower with the spirochetal antigens than with the lipoid antigens. The increased specificity of spirochetal antigens has not been definitely established and the occurrence of positive reactions with these antigens cannot be accepted as indicative of a syphilitic infection. Rein and Pillemer found that fresh unheated serum inhibits or retards the aggregation of lipoidal antigens by the serums of syphilitics. Of greater interest was the finding that fresh serum had little or no effect on the aggregation of lipoidal antigens by the positive serums of horses and cows or the positive serums from nonsyphilitic individuals. Based on these findings, an "inhibition procedure" was devised with the belief that it might differentiate between true and false positive serologic reactions for syphilis. During the past year several thousand serums have been subjected to this experimental inhibition procedure. At first the results were exceptionally good and most encouraging. Before long, however, it was found that this method had definite limitations. The other verification, confirmation, and spirochetal complement-fixation tests also had limitations which rendered them unsatisfactory for practical use.

Before any test can be considered of practical value as a verification procedure and used routinely, it must be able to satisfy the following criteria:<sup>16</sup>

1. *Serums from syphilitic individuals with positive serologic tests should always give a syphilitic type of verification reaction.* No test at the present time satisfies this criterion. In the majority of individuals with darkfield positive syphilitic chancres of less than two weeks' duration, the various verification tests will be of the false positive type. Furthermore, syphilitic individuals who have received varying amounts of antisyphilitic treatment will also show the false positive type of verification reaction. These are serious limitations. An individual with an early primary lesion may have applied local medication, thereby rendering the chancre darkfield negative. The serum from this patient when subjected to a verification test may give the false positive type of reaction. The clinician faced with such a report could be influenced into a false sense of security and he might consider the lesion to be nonsyphilitic. The harm resulting from such practice is obvious. Furthermore, patients are often started on antisyphilitic treatment because of positive blood tests detected during routine serologic examina-

15. Parran, T., et al.: Preliminary Report on the Washington Serology Conference, Ven. Dis. Inform., 23:161, May 1942.

16. Rein, C. R., and Elsberg, E. S.: Are Current Verification Tests of Practical Value in the Serodiagnosis of Syphilis? J. Soc. Invest. Derm. (accepted for publication).

tion. After a few weeks or months of treatment the patient consults another physician who believes that this individual never had syphilis but was treated on the basis of false positive serologic reactions. A verification reaction at this time may be worthless and give an erroneous picture because treated syphilitic individuals as well as treated nonsyphilitic individuals may give the false positive type of verification reactions. It would be an injustice to discontinue antisyphilitic treatment in all of these individuals because those who actually have syphilis may go on to develop the late sequelae of the disease.

2. *Serums from nonsyphilitic individuals with positive serologic tests should always give the false positive type of verification reaction.* This, too, is not fulfilled by any of the present-day verification tests. The syphilitic type of verification reaction occurs in a considerable proportion of nonsyphilitic lepers. The same type of verification reaction has been occasionally observed in individuals who develop false positive serologic reactions following upper respiratory infections, smallpox vaccinations, and primary atypical pneumonia. It is anticipated that other nonsyphilitic diseases may produce positive serologic reactions of the syphilitic type.

3. *The diagnosis of syphilis should be established in persons who consistently give the syphilitic types of verification reaction on repeated examination.* No present-day verification test satisfies this criterion. Several examples have been observed of repeated syphilitic types of verification reactions in individuals with proved biologic false positive serologic reactions. The serums of these patients became negative in relatively short periods of time without the use of antisyphilitic treatment.

4. *The diagnosis of syphilis should be excluded in persons who consistently give the biologic false positive (nonsyphilitic) type of verification reaction on repeated examination.* This, too, is not fulfilled by any of the present-day verification tests. Many examples have been observed of repeated false positive types of verification reactions in proved syphilitic individuals, particularly if they have received varying amounts of antisyphilitic treatment. It is also apparent that the types of verification reaction obtained will depend, to some extent, on the quantitative reagin content of the patient's serum. High filtered serums usually give the syphilitic type of reaction, particularly if the complement-fixation test gives a positive reaction, whereas serums from proved syphilitic individuals with low titers as a result of antisyphilitic therapy or because of the long duration of the disease usually give the biologic false positive (nonsyphilitic) type or inconclusive type of reaction.

#### QUESTIONABLE CASES

Current verification tests are of no practical value by themselves in the routine serodiagnosis of syphilis since the majority of serums for which verification tests are requested are from



"questionable cases," by which we mean individuals in whom there is no clinical or anamnestic evidence of syphilis but who have had doubtful or positive serologic reactions on repeated occasions. In our experience the verification tests do not always give the syphilitic type of reaction with serums from proved syphilitic individuals nor do they always give the false positive type of reaction with serums from proved nonsyphilitic individuals. Therefore, too much confidence cannot be placed on verification test results in those individuals whose syphilitic status is in doubt. Yet the verification tests must be applicable to such questionable cases if they are to be of any distinct value. This does not mean that the use of verification tests should be discontinued. The results obtained by the various serologic and immunochemical procedures have been most encouraging, and investigations along these lines should be continued because the need of a verification procedure is exceedingly great. But for the present, all verification tests should be considered as in the experimental stage until a procedure is developed which will satisfy the criteria mentioned. Until that time, such procedures should be used only experimentally by the originators of the tests and by the research serologist and not routinely by the average serologist.

The diagnosis of a syphilitic infection should not be made on the basis of the results obtained with the various serodiagnostic tests and verification procedures alone. The final diagnosis should depend on the ensemble of the available data including: (1) detailed history, (2) complete physical examination, (3) radiological examinations of the heart and aorta, (4) spinal fluid examination, (5) examination of contacts, marital partners, brothers, and sisters, and (6) repeated serologic examinations in the same and other laboratories. Furthermore, additional laboratory examinations should be made, including blood counts, blood smears, heterophil antibody tests, sedimentation rates, specific complement-fixation, precipitation and agglutination tests, and albumin-globulin ratio studies, in order to rule out some of the more common nonsyphilitic diseases which may cause false positive serologic reactions.

#### CONCLUSIONS

1. Several methods have been developed for the differentiation of the true positive (syphilitic) serologic reactions from the false positive (nonsyphilitic) serologic reactions. None of these methods has been able to distinguish consistently between true and false positive serologic reactions. There is need for such a procedure which is reliable and investigations along these lines should be encouraged.

2. Any new verification test should be subjected to critical evaluation by independent workers before it is adopted as a routine procedure for the differentiation between true and false positive serologic reactions.

# Dental Study of U. S. Soldiers in the Tropics

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Dental Corps, Army of the United States

Several months after I joined the American division on the Fiji Islands as dental surgeon for the 132d Infantry, it seemed I had detected far more carious teeth than normal for men in this age group. These men were in the first task force to leave the United States after Pearl Harbor and except for six days in Australia had lived, at the time of writing, thirty-two months in the tropic jungles. They left the United States in January 1942 and spent nine months in New Caledonia as defensive troops, four months at Guadalcanal in combat, nine months on the Fiji Islands recuperating and training, and to date nine months on Bougainville in combat. If it were true that the incidence of caries increases in the tropics, the incidence of caries in the group under study should have been increased. The factors which might contribute to increased caries in these men other than living in a tropical climate are: infectious tropical diseases, of which malaria is predominant; lack of professional dental attention; poor oral hygiene; sub-clinical avitaminosis or other diet deficiency due to an army ration which in great part consisted of dehydrated, canned, and powdered foods; and emotional disturbances due to combat.

Studies have been made showing that the human body does undergo changes in the tropics. Blood volume is known to increase. The blood phosphorus level is said to be reduced. Changes in digestive functions and in the activity of endocrine glands and an effect on the nervous system are said to occur. Nail and hair growth is slowed down. Some factors in life in the tropics might cause increased caries.

I began collecting data on soldiers after they had been overseas from two to two and one-half years. I gathered the same data about new men who joined as replacements on Fiji and had been overseas from five to twelve months. The records were made as the men came into the dental office with routine dental appoint-

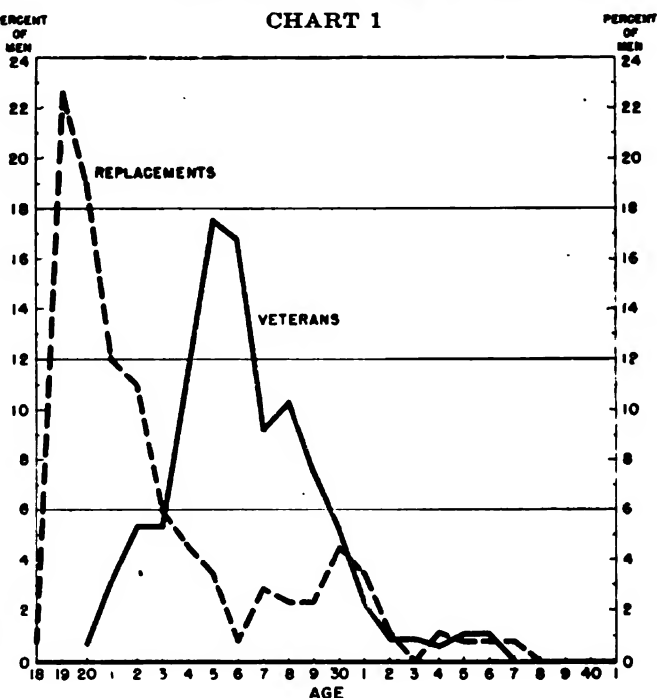
TABLE I  
*Ages of the two groups*

Age	Replacements Percent	Veterans Percent
18	0.5	0
19	22.5	0
20	19.0	0.44
21	12.0	3.11
22	11.0	5.33
23	6.0	5.33
24	4.5	11.55
25	3.5	17.77
26	0.5	16.88
27	3.0	9.33
28	2.5	10.21
29	2.5	7.55
30	4.5	5.77
31	3.5	2.66
32	1.0	0.88
33	0	0.88
34	1.0	0.44
35	0.5	0.88
36	0.5	0.88
37	0.5	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0.5	0

ments, no effort being made to obtain a select group. Data on two hundred twenty-five veterans and two hundred replacements were recorded. Replacements who joined the regiment on Bougainville were not included. All men recorded had experienced combat.

The majority (64.5 percent) of the replacements were from nineteen through twenty-two years of age while the veterans (65.74 percent) were from twenty-four through twenty-eight years of age (table I and chart 1).

I recorded caries in two categories: (1) one surface caries, namely simple occlusal, buccal, or labial caries; (2) two or more surface caries including at least one proxima surface.



Restorations which were present at the time of the examination were recorded in a like manner. Table II shows there was almost no difference in the total amount of caries between the two groups. The average number of caries per man in each group is 5.7. The veterans show a slightly greater number of proximal caries. The same table shows that at the time of examination the veterans had on the average two more fillings than the replacements, most of which were two or more surfaces.

TABLE II

No. per man	Caries			Fillings			Grand total
	O	P	Total	O	P	Total	
Replacements	3.21	2.48	5.69	3.65	3.16	6.81	12.50
Veterans	2.94	2.76	5.70	3.86	5.03	8.89	14.57

O indicates one surface; P, two or more surfaces.

Table III is an arbitrary breakdown of caries and fillings into groups and the percentage of men in each group. The trend is the same and the percentage of men in each group is rather close.

TABLE III

Number	Replacements		Veterans	
	Caries	Restorations	Caries	Restorations
0	4.5	13.5	5.77	10.22
1-3	30.5	21.0	28.88	19.11
4-5	19.0	16.5	22.22	10.66
6-10	31.0	24.5	32.44	20.44
11-15	9.0	15.5	7.99	21.77
16-20	5.0	5.5	2.22	11.11
20+	1.0	3.5	0.44	6.66

Even though the veteran averages no more caries per man than the replacement, he might have lost more teeth while overseas or be in need of more extractions at the time of

TABLE IV  
*Percentage of men missing teeth*

Replacements	Upper		Lower		Total	
	R	L	R	L	Upper	Lower
Central	7.0	4.0	0.5	1.0	11.0	1.5
Lateral	12.0	10.5	0	0	22.5	0
Cuspid	3.0	4.0	0	0.5	7.0	0.5
1st bicuspid	17.0	15.0	3.5	3.5	32.0	7.0
2d bicuspid	16.0	17.5	7.5	9.0	33.5	16.5
1st molar	32.0	31.5	43.5	46.5	63.5	90.0
2d molar	12.5	11.5	14.0	19.5	24.0	33.5
Average number of teeth missing					1.935	1.49
<b>Veterans</b>						
Central	6.66	5.33	1.33	2.66	11.99	3.99
Lateral	8.33	8.0	0.44	0.44	13.33	0.88
Cuspid	5.33	3.55	0	0	8.88	0
1st bicuspid	14.22	12.44	3.99	2.66	26.66	6.66
2d bicuspid	22.22	16.44	12.88	8.88	38.66	21.77
1st molar	36.44	36.44	46.66	50.22	72.88	96.88
2d molar	7.55	7.55	20.44	17.77	15.11	38.22
Average number of teeth missing					1.866	1.684

TABLE V  
*Percentage of men requiring extraction*

Replacements	Upper		Lower		Total	
	R	L	R	L	Upper	Lower
Central	1.0	3.0	2.0	1.0	4.0	3.0
Lateral	1.5	1.5	1.0	1.0	3.0	2.0
Cuspid	1.5	1.5	0.5	1.0	3.0	1.5
1st bicuspid	1.0	0.5	0.5	0	1.5	0.5
2d bicuspid	3.0	5.0	1.5	2.5	8.0	4.0
1st molar	4.0	3.0	0.5	3.5	7.0	4.0
2d molar	1.5	2.0	2.0	2.5	3.5	4.5
3d molar	4.0	9.5	4.0	4.5	13.5	8.5
Average number of teeth extracted—0.715						
<b>Veterans</b>						
Central	1.77	0.44	0	0	2.22	0
Lateral	1.33	0.44	0	0	1.77	0
Cuspid	0	0.88	0	0	0.88	0
1st bicuspid	0	0.88	0.44	0.44	0.88	0.88
2d bicuspid	0.88	3.55	0.88	1.33	4.44	2.22
1st molar	6.22	0	0.88	2.22	6.22	3.11
2d molar	1.33	1.33	2.22	2.66	2.66	4.88
3d molar	7.55	7.55	4.88	5.77	15.11	10.66
Average number of teeth extracted—0.559						

TABLE VI  
*Percentage of men missing teeth following required extractions*

Replacements	Upper		Lower		Total	
	R	L	R	L	Upper	Lower
Central	8.0	7.0	2.5	2.0	15.0	4.5
Lateral	13.5	12.0	1.0	1.0	25.5	2.0
Cuspid	4.5	6.0	0.5	1.5	10.5	2.0
1st bicuspid	18.0	15.5	4.0	3.5	33.5	7.5
2d bicuspid	19.0	22.5	9.0	11.5	41.5	20.5
1st molar	36.0	34.5	44.0	50.0	70.5	99.0
2d molar	14.0	13.5	16.0	22.0	27.5	38.0
<b>Veterans</b>						
Central	8.44	5.77	1.33	2.66	14.22	3.99
Lateral	6.66	8.44	0.44	0.44	15.11	0.88
Cuspid	5.33	4.44	0	0	9.77	0
1st bicuspid	14.22	13.33	4.44	3.11	27.55	7.55
2d bicuspid	23.11	19.99	13.77	10.22	43.11	23.99
1st molar	42.66	36.44	47.55	52.44	79.11	99.99
2d molar	8.88	8.88	22.66	20.44	17.77	43.11

examination. I found this not to be the case. Table IV shows the percentage of men and the teeth they were missing at the time of examination. The percentage of men who required extraction at the time of examination is shown in table V. The final picture or summation of tables IV and V (table VI) shows the total percent of men and the teeth they were missing after necessary extractions were made. The differences in both groups are negligible. Almost all of the men in each group are missing at least one lower first molar. No great difference between the two groups was found in the total number of teeth missing or requiring extraction, indicating that the tropics had no bearing on the number of teeth lost.

Of the veterans, 77.34 percent had contracted malaria, compared with 8 percent of the replacements. Except for one man who had had malaria four times, the 8 percent of the replacements had had malaria from one to three times; 52.87 percent of the veterans who had contracted malaria had had from one to five attacks, and 47.13 percent had had from six to ten or more attacks.

Those veterans who had never contracted malaria averaged one less caries per man. The 11.55 percent who had had malaria frequently over a relatively short period of time averaged two more carious teeth. Some of these men had had as many as twenty-one attacks. I found, however, that these same men have no more than the average total number of missing teeth (3.56 teeth per man compared to the average of 3.55) nor did they require a more significant number of extractions (0.64 teeth compared with the average of 0.559 teeth extracted).

The greater percentage of veterans (65.76 percent) who had had malaria one to ten times have no more than the average number of caries per man.

The amount of professional dental attention the men in both groups received would no doubt play an important part in the results of the total caries incidence at the time of the examination. Had the veterans received far less care than the replacements, they would be expected to have a higher caries incidence. Table VII shows the time when the last appreciable amount of dental work was done on the patient and the percentage of men who had work done during these time intervals. Five percent of the replacements had never been to a dentist. Most of these were men who had little or no caries. More veterans (3.72 percent) had dental attention within six months prior to examination. Most of the replacements had received dental attention prior to leaving the United States. Previous to combat, a number of veterans had received dental care. During combat, the number receiving care

TABLE VII

Years	Replacements	Veterans
0	5.0	0
1/12 - 6/12	18.5	22.22
7/12 - 1	45.0	26.66
1 1/12 - 1 6/12	17.0	17.77
1 7/12 - 2	6.5	8.88
2 1/12 - 3	2.5	13.33
3 1/12 - 5	2.0	7.55
5 1/12 - 10	3.0	2.66
10+	0.5	0.88

had fallen off. During the rest period they were once again attended. A far greater percentage (13.85 percent) of the replacements had received care within the last year and one-half. Even so, 75.53 percent of the veterans had received some dental service within the two years preceding the examination, compared with 87 percent of the replacements receiving attention during the same period.

Table VIII indicates the condition of the gingiva, table IX the amount of calculus and table X the amount of recession present in both groups according to the percentage of men in each category. Far more veterans had healthy normal gingival tissues than the replacements; more replacements had no recession. This I believe due almost entirely to the difference in age between the two groups. The number of men who have medium or heavy re-

TABLE VIII  
*Condition of gingiva*

	Replacements	Veterans
G	60.0	68.88
F	18.5	14.66
I	21.5	16.44

G-Healthy, normal tissue; F-Fairly good tissue health; I-Inflamed, moderately or severe.

TABLE IX  
*Calculus*

	Replacements	Veterans
O	48.5	43.55
S	22.0	28.88
M	18.5	16.44
H	11.0	11.11

O-No calculus; S-Slight; M-Medium; H-Heavy.

cession is very close in both groups; 5 percent more replacements have no calculus. This I consider due to the more recent dental care received by the new men; 1.95 percent more replacements, however, have medium or heavy deposits of calculus.

Has oral hygiene aided in the prevention of caries or played any part in the results shown in tables VIII, IX, and X? I found in recording attention to oral hygiene that 3.65 percent more veterans brush their teeth frequently or

TABLE X  
*Recession*

	Replacements	Veterans
O	58.0	46.66
S	16.5	26.33
M	12.0	13.33
H	13.5	13.77

TABLE XI  
*Oral hygiene*

	Replacements	Veterans
D	78.5	84.88
F	8.5	5.77
I	9.5	6.22
N	3.5	3.11

D-Daily; F-Frequently—four or more times per week; I-Infrequently—three or less times per week; N-Never.

daily than do the replacements; 6.38 percent more veterans brush their teeth at least once each day. This would account, I believe, for the better condition of the gum tissue in the veteran (5.06 percent more replacements than veterans have inflamed tissue). Table XI compares the two groups as to oral hygiene.

Table XII compares the condition of the gingiva with relation to oral hygiene. Note that 11.94 percent more veterans than

TABLE XII  
*Gingival health according to oral hygiene*

Oral hygiene	D			F			I			N		
Gingiva	G	F	I	G	F	I	G	F	I	G	F	I
Replacements	52.5	12.0	14.0	4.5	2.5	1.5	2.0	3.5	4.0	1.0	0.5	2.0
Veterans	64.44	10.22	10.22	2.66	2.22	0.88	1.77	2.22	2.22	0	0	3.11



replacements brush their teeth daily and have healthy gingiva. Those in both groups who practice daily tooth-brush technique seem to have a slightly less caries incidence than others. Comparing those men with daily care and healthy tissue with the incidence of caries, I found that the veterans in this category have an average of 5.09 caries per man; the replacements, an average of 5.27 caries per man. While slight, the difference shows an inclination toward a lower incidence of caries when daily care is practiced.

#### SUMMARY

1. A group of veterans with more than two years' service in the tropics was compared with a group of replacements. The veterans were in their late twenties; the replacements were in their early twenties. The veterans averaged exactly the same number of caries per man as the replacements. The veterans (older men) averaged two more restorations per man than the replacements. There was no significant difference in the number of teeth which were missing or had to be extracted at the time of examination in both groups.

2. The majority of the veterans had had malaria, and about one-half of them had had ten or more attacks. Only 8 percent of the replacements had had malaria from one to three times. Those men who had had malaria many times showed a higher incidence of caries. These same men did not require more than the average number of extractions nor were they missing more than the average number of teeth. Those men with malaria one to ten times had the average number of carious teeth.

3. The veterans have better oral hygiene habits. The gingival tissue of the veterans is, on the whole, healthier than that of the replacements. The replacements have less calculus and recession of gingival tissue. Those men who practice daily oral care have slightly fewer caries than the average.

#### CONCLUSION

There was very little if any difference in the incidence of caries, number of teeth missing or requiring extraction, or other dental disorders between a group of United States soldiers who had more than two years' service in the tropics and their replacements.

WD Circular No. 447  
24 Nov. 44  
Sect. IV

WD Circular No. 449  
25 Nov. 44  
(Restricted)

WD Circular No. 454  
29 Nov. 44  
Sect. III

Directions for disposition of dental material removed from the mouths of Army dental patients are contained in this section.

Suppressive therapy for malaria among troops returning from overseas will be discontinued the 29th day after their arrival except when specific indications exist for its continuance.

Prescribes manner of wearing new honorable discharge emblem on uniform of all military personnel who have been discharged or separated from service under honorable conditions.

(See also page 59.)

# Apparatus

## SPOT FILM DEVICE FOR ARMY RADIOGRAPHY

CAPTAIN STANLEY M. WYMAN

Medical Corps, Army of the United States

The roentgenologic service at this hospital has long felt the need for a device to obtain a permanent record of fluoroscopic findings. Such mechanism is not available on the standard 200-Ma. General Electric radiographic-fluoroscopic unit supplied by the Army, and only recently has it been possible to improvise one through the cooperation of the 98th Ordnance Company, Heavy Maintenance Tank. With designs submitted by this service and using scrap materials and parts, they have made a very satisfactory device, which consists of a frame of duralumin corresponding to the size of the fluoroscopic screen mounting. The frame has

two end pieces connected by two steel bars constructed of drill rods of  $\frac{3}{8}$ -inch diameter, each provided with three  $\frac{3}{16}$ -inch grooves. The carriage is cut from a single piece of duralumin, embodies a slot in which the cassette is placed, and runs on the steel bars by means of three  $\frac{3}{16}$ -inch steel ball bearings placed at each corner of the carriage. The frame is attached to the underside of the screen mounting by bolts threaded into the mounting. Motive force for the carriage is provided by a circular spring from the drum of a submachine gun magazine. Braking power is obtained by a pneumatic tube of steel mounted on the same side of the frame as the spring to reduce torque and binding of the carriage. A

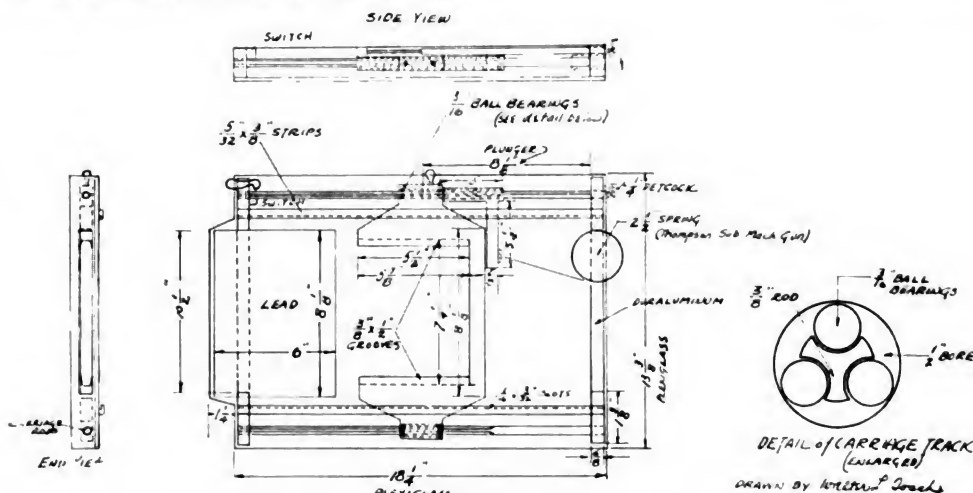


steel plunger with a leather washer at its end is embedded in the carriage and slides in the tube. Regulation of the amount of braking force desired is governed by a valve, improvised from a radiator petcock and placed at the end of the tube. A spring catch automatically holds the carriage at the extreme left side of the frame and when released it permits the carriage to be pulled by the spring into the center of the visual field. Bolted to the under side of the frame is a single large sheet of plexiglass to which is attached a stationary sheet of lead to shield the film until it is to be exposed. There is also a slide on the under side of the plexiglass into which fits a sheet of lead with a central cone of aluminum for taking films with compression. This may be pushed aside during normal fluoroscopy. This device is designed to accommodate a British cassette measuring about  $5\frac{1}{2}$  by  $7\frac{1}{4}$  inches. However, the design can be modified so that the carriage will receive a standard 8- by 10-inch cassette, placing the cassette horizontally instead of vertically, thus making it possible to take two exposures on a single film.

The current in the fluoroscopic tube is automatically changed from fluoroscopy to radiography by means of a push switch mounted on the left side of the frame. This switch is opened by contact with the carriage

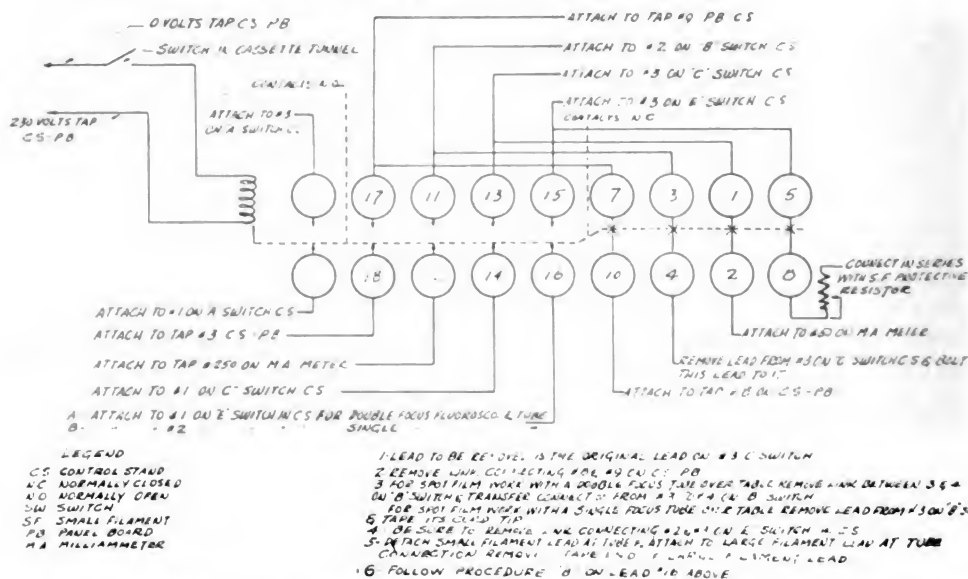
Lieut. Colonel J. R. Lingley, M. C., contributed helpful ideas, and Technician Third Grade Cloyce C. Carter and Technician Third Grade Walter L. Tosch gave valuable assistance in the electrical problems and drawings, respectively.

when the carriage is in position for fluoroscopy. It closes on releasing the carriage and in turn activates a double-throw, solenoid type switch having five contacts. The fluoroscopic tube is so wired that only the large focal spot is used, thus obviating a shift of the image on the screen in changing from the small to large focal spots.



To compensate for the added weight on the fluoroscopic arm, it was found necessary to shorten the rod at the upper end of the long coil spring which holds the fluoroscopic arm in the horizontal position. Counter-balance in the vertical position is easily regulated by adding sheet lead to the carriage under the table. When properly adjusted, the fluoroscopic arm is no more difficult to control than without this device.

CHANGES THAT ARE MADE IN A TYPE 6 LAY E SINGLE & DOUBLE FOCUS DX TUBE UNIT  
SEE P. 3 & 4 BELOW



This machine is convenient, easy to operate, and has the following advantages over many of the commercial models: (1) An unusually wide field of vision is available for routine fluoroscopy. (2) The small size and light weight of the device permit easy palpation during all fluoroscopic examinations.